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Encyclopædia of Horticulture

FOR

GARDENERS AND BOTANISTS.

MISSOURI
BOTANICAL
GARDEN.

EDITED BY

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ASSISTED BY PROFESSOR J. W. H. TRAIL, A.M., M.D., F.L.S., IN THE PARTS RELATING TO INSECTS AND FUNGI; AND J. GARRETT IN THE FRUIT, VEGETABLE, AND GENERAL GARDEN WORK PORTIONS.

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REFERENCE TO ILLUSTRATIONS OF PLANTS OTHER THAN THOSE FIGURED IN THIS WORK.

IT has been suggested, by an eminent Authority, that many readers would be glad to be informed where reliable Illustrations could be found of those Plants which are not figured in this Work. To meet this want, references to the figures in Standard Authorities have been given, the titles of the Works referred to being, for economy of space, abbreviated as follows:

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FIG. 380. FLOWERING BRANCH OF LAVATERA TRIMESTRIS.

LAWN MOWERS. Since the introduction of mowing machines in such variety, and in such a number of sizes, their use has become general, both in large and small gardens, almost to the exclusion of scythes. Machines of various makers differ much more in details of construction than in matters relating to the method of cutting adopted. The general principle is that of fixing a broad horizontal blade, with an edge on the front. This is called the ledger blade, and is kept in position just above the ground, by raising or lowering small rollers on the front of the machine. The cutting blades, which are arranged spirally, revolve by any forward movement, unless provision is made for disconnecting them, and sever the grass on coming into contact with the ledger blade. Revolutions of the cutters are caused by their being connected, usually by cogwheels, to two rollers, generally called drums, at the back of the machine. The spindle passing through this part has a circular cogwheel on one of its ends, sometimes made reversible, and on any forward movement of the drum all the parts are set in motion. In the case of Lawn Mowers drawn by horses, an arrangement is made by which the cutters may be stopped at any time, for conveying the machine short distances, by shifting a movable catch in one end of the drum. The number of cutters varies in different machines, some being placed wide apart, for the special purpose of cutting long grass. The "Archimedean," an American Lawn Mower, was specially noted for this on its introduction, and is now pretty well known. An improved form, manufactured by Messrs. Williams and Co., has all the parts to work either separately or in connection, and the knives revolve very rapidly when in use. The "Excelsior," another Lawn Mower of American make, manufactured by the Chadborn and Coldwell Manufacturing Co., is specially notable for lightness of draught, cutting without ribbing, its easy and novel mode of adjustment, and the complete protection afforded the wheels and mechanism from injury or from clogging with grass, &c. Unlike the adjustment in most other machines, the sole-plate, in this case, is not a fixture, but is advanced to the blades by means of screws, which are turned by an ordinary spanner. Each of the four knives is complete in itself and removable in case of accident. Ransome's "Automaton" is an exceedingly useful Lawn Mower for general use. It is made in various sizes; those from 12in. to 22in. are recommended. Many of Green's Lawn Mowers are worked by means of a flat-link chain instead of cog-wheels. Some persons object to this, on account of the chain occasionally coming off when on sloping ground. That the machines are durable, and do their work well, is, however, unquestionable. In Shanks's Patent Lawn Mower, manufactured by Alex. Shanks and Son, the sole-plate, or ledger blade, has a double reversible edge, and is thus enabled to last longer than most others. This machine is specially recommended in the size worked by a horse, as it is strong in construction, and has a good delivery of grass into the box, and an admirable system of emptying the latter when full. Edwards' Patent "Invincible" Lawn Mower, manufactured by J. Crowley and Co., is a smooth-working machine with reversible cutters. Regulating rollers can be fixed before or behind the knives, or in both positions, or the machine may be used without any. It makes but little noise when at work; and the mechanism is simple, and easily understood. There are other Lawn Mowers, *in quantity far too numerous to mention here*, some of which may possibly have an advantage in certain particulars over those referred to above. All the smaller sizes are made so that the grass-box may be easily removed at any time. Some people prefer using the machine without a grass-box; but, if the crop is unduly heavy, this plan does not always answer. It is very important that a machine of any description should be kept clean when not in use, and be cleansed throughout each time after being used. Rust and dirt on the blades are often more destructive than constant wear with cleanliness enforced. The knives should always be made to work quite evenly on the ledger blade, so that a piece of paper may be cut on any part alike. It is not advisable to have the blade too low, as many of the tender grasses are thus cut too close and killed, and the remainder presents an unsightly appearance for a time, until new growth is resumed. Lawn-edge Clippers are small machines made for following the Lawn Mower and cutting the grass along the edges of walks. Some of them are made with a drum roller, which is connected and sets the other parts in motion by every forward movement. In Green's patent machine, the chain and wheel motion is adopted, a fixed blade is guided along the edge, and a cutter, with several edges, revolves against it and severs the grass. Adie's Patent Clipper has blades somewhat like shears, the point of the under one being regulated to run ½in. below the turf level. On applying a downward or forward pressure of a few pounds, the blades open, and, being connected to a strong spring, close suddenly, and, in doing so, perform their intended work. Lawn-edge Clippers are not at present extensively used, the difficulty in guiding them straight, or in following a curved edge, being much against them. The value of such machines, if improved so as to be available for ordinary use, would be very great, as an immense amount of labour, in clipping with hand-shears, would be avoided.

LAWNS. A well-made and properly kept Lawn is always one of the most important features in connection with any garden, especially that surrounding a residence. Where it is improperly levelled and made in the first instance, the defects in the surface caused by holes, or subsidence of the soil in one place more than another, cannot well be satisfactorily remedied. The form and extent of the Lawn will, of course, vary in almost every case; the more it covers, the better will be the effect produced, if the work has been well done; and, on the other hand, the more prominently will any inequalities be seen. Close-cutting machines, now so much in use, cannot dip into holes, consequently the grass here is left comparatively long, while that on the higher portion around is cut

Lawns—*continued.*

shorter than it would be on an even surface. Lawn preparations should be commenced in autumn, and, if the site is not naturally drained, it must be made so artificially, by the insertion of pipes, before anything else is attempted. An undulation, or a gravelly sub-soil, will alone usually insure a sufficient drainage. The various levels of the surface should then be marked, and the whole be dug over a spit deep, and as evenly as possible. If the soil is of fairly good quality, and not very heavy, there will be no difficulty in doing this, or in the formation of the Lawn afterwards. Where it is very poor and sandy, the addition of some that is heavier, and of better quality, will be advisable, as there is a great difference throughout the season in the appearance of Lawns, according to the depth and quality of the soil beneath. This may appear somewhat needless; but the work should be considered as one of a permanent character, and after-results will well repay the extra trouble and expense incurred. The soil, having been thus dug all over alike, should be allowed to remain until spring, if possible, when exposure to rain and frost will have rendered it solid, and in good condition for treading and raking down, in preparation for turf or grass seeds, whichever may have been intended. If good turf can be secured, a Lawn may be made at once. It should be free from coarse grass and weeds, and if the turves have been cut uniform in thickness and size, they may soon be laid, and the work finished. Some fine light soil should be spread over and brushed in, to fill up all the interstices, and the turf-beater—a tool made specially for the purpose, with a flattened

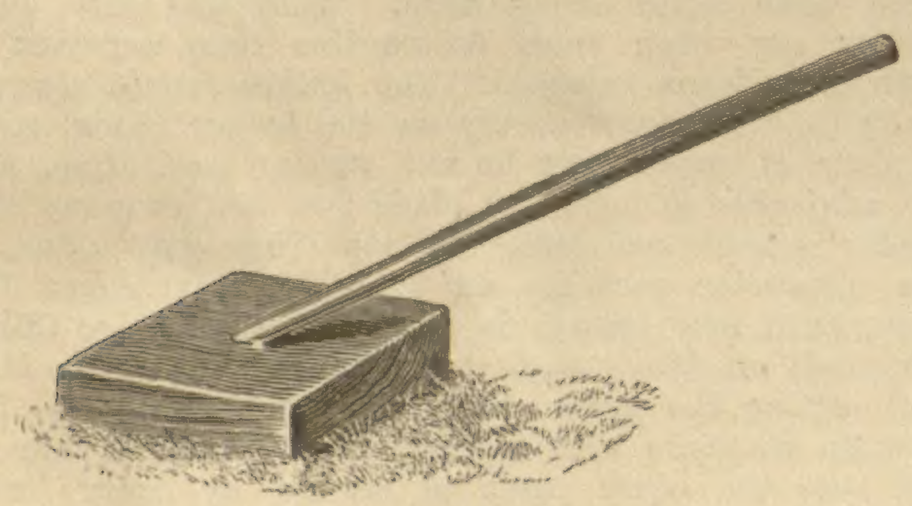

FIG. 381. TURF-BEATER.

wooden head (see Fig. 381)—applied to make a plane surface. It is not advisable to mow too closely the first summer, especially if the season be a dry one.

When recourse is had to grass seeds, they should be purchased from a reliable source, even though the price be higher than that usually paid; spurious stocks being worse than useless, where a piece of fine grass is of first importance, and the mowing machine is to be kept in use. The best season for sowing is in March and April, as the warm sunshine and showery weather then usually experienced is more favourable than any other for the quick germination of the seed. It will be necessary to tread and work the ground all over, the same as for turf, allowing the surface to be the full height required for the Lawn. A verge of turf round the outside is a good guide in preparing a Lawn for grass seeds, as by its height a good deal may be determined with the eye alone in levelling the inside part. The seeds should be sown thinly, on a calm day, and lightly covered by means of a wooden rake; and, when the grass is well up, a heavy roller may be drawn over it before mowing. The next best season to April, for sowing, is the end of August, as the weather is then cooler than in summer, and there is sufficient time for the grass to become established before winter. From 40lb. to 50lb. to an acre is about the quantity of grass seed required for a Lawn;

Lawns—*continued.*

but so much depends on the quality that it is uncertain whether this weight will be always sufficient. Mixtures of strong-growing sorts are prepared and sold separately for sowing under trees. Lawns which become unsightly may be renovated considerably by a covering of about ¼in. of rich light soil in autumn or early spring. A similar dressing of two parts loamy soil with one of powdered lime, may be recommended for applying in autumn, or at any time during showery weather, to Lawns covered with moss. Nutriment derived from such dressings by the old grass, and an additional light sowing of new seeds, will tend greatly to bring old Lawns into a much finer condition. Where plenty of water is at command, it may be freely applied in the evening, after dry days, in summer; but mere sprinklings are best left alone. The keeping of Lawns, when once established, is work of a routine character, consisting chiefly of mowing, rolling, and sweeping. All of these operations require frequent attention, particularly in spring and summer.

LAWN SAND. A preparation said to have the power of destroying Daisies, Ribbed Grass, Plantains, Dandelions, &c., in lawns, and, at the same time, improving the quality of the grass. It should be applied in dry weather, evenly, through a dredging box; or about a thimbleful may be put on the centre or crown, varying the quantity according to the size of the weed. The use of Lawn Sand is not here recommended, as, although the crowns of strong weeds may be killed, their tap roots remain alive, form three or four fresh crowns in due course, and eventually grow with renewed vigour, thus necessitating a second or third application. Wherever Lawn Sand is carelessly applied, the grass becomes burnt up, and very unsightly, in a few hours. Sulphate of ammonium, which can be bought for 4d. per lb., has much the same effect.

LAWSONIA (named after Dr. Isaac Lawson, a botanical traveller, who published an account of a voyage to Carolina in 1709). SYN. *Alcanna.* ORD. *Lythrarieæ.* A monotypic genus, the species being a stove tree. It thrives in a compost of sandy peat and turfy loam. Propagated by cuttings of ripened shoots, placed in sand, under a glass, in heat.

L. alba (white). Henna Plant. *fl.* white, small, sweet-smelling, disposed in panicles. *l.* opposite, lanceolate, quite entire. *h.* 6ft. to 10ft. Northern Africa, Arabia, Persia, and India, 1752. SYN. *L. inermis.*

L. inermis (unarmed). A synonym of *L. alba.*

LAX. Loose; not compact.

LAXMANNIA (named after E. Laxmann, 1737-1796, a Siberian traveller). ORD. *Liliaceæ.* A genus comprising eight species of greenhouse perennials, with fibrous roots, confined to Australia. Flowers white or pink, in terminal, pedunculate or sessile heads, with imbricated scarious bracts; perianth persistent, but not twisted, of six segments. Leaves narrow-linear or subulate, in radical or terminal tufts, dilated at base into scarious, sheathing appendages, which are often produced into bristles. Stems short and tufted, or elongated, branched, and diffuse. The species require a compost of loam and peat. Propagated by divisions. *L. gracilis* and *L. grandiflora* are probably the only species introduced.

L. gracilis (slender). *fl.* pink, very shortly pedicellate, or almost sessile; heads small, on slender peduncles of several inches. June. *l.* crowded at bases and ends of branches, the short, broad, sheathing bases imbricate, with a few woolly hairs on their margins; the blades filiform, erect or spreading, ½in. to 1in. long. Stems slender, branched, forming loose tufts of 1ft. or more. 1824.

L. grandiflora (large-flowered). *fl.* one, two, or three within each bract; outer segments of perianth often very white; outer empty bracts scarious, with brown centres; peduncles 6in. to 10in. long. June. *l.* crowded, 1in. to 2in. long, the scarious sheaths terminating in long fringed bristles. Stems tufted when old, densely and shortly branched.

LAYERING. Layering is a method of propagation by means of which plants are rooted and increased while still fed by the parent. It is a most useful plan for propagating plants that do not succeed when wholly detached as cuttings. Sap flows through branches by the alburnum, and youngest layers of wood, to the leaves, and then returns by the inner bark, forming woody matter in its progress. The principle on which Layering is founded, is that of causing the returning sap to form roots at a certain place, of suitable texture, in the stem, and so constitute a separate and independent plant, which may afterwards be detached, and utilised for perpetuating the species. In some cases, roots are readily emitted from almost any firm portion of a branch, by merely fixing it and covering with soil. Generally, however, it is necessary to partially interrupt the course pursued by the sap, in order to induce it to form other roots, instead of returning to those of the parent plant. With this principle in view, various modes of Layering are practised, according to circumstances, and the sort of plant under treatment. The principal methods adopted are: Layering by simply Bending and Pegging the branch into the earth, Tongueing or Heeling, Ringing, Wiring or Strangulation, Twisting, Piercing, Serpentine Arching, and Insertion of the Growing Point.

Layering by simply Bending into the earth is very easy, and plants are readily propagated when it succeeds. All buds should be removed from the shoot, except a few near the top, which are intended for forming leaves. The part covered with soil should be secured with a peg, and the point bent in an upright direction, and tied to a stake.

FIG. 382. METHODS OF LAYERING.
A, By Tongueing or Heeling. B, By Ringing.

Tongueing, or Heeling, is a method largely practised, with much success. It consists of cutting the branch half-way through, below a bud, and making an incision (varying in length with different plants) in an

FIG. 383. LAYERING BY TONGUEING OR HEELING.

upward direction towards the point (see Figs. 382, A, and 383). In covering with earth, it is important that the cut

Layering—*continued.*

surfaces be kept separated by some of the soil, or another substance, such as a small piece of wood; otherwise, the parts might unite again, instead of forming roots.

Ringing is a mode represented in Fig. 382, B. The Layer is bent down, and secured with a peg, as in the process of Tongueing; but, instead of the wood being cut, a ring of bark is taken off—in this case, cutting quite through the outer and inner layers, in order to effectually arrest the sap on its return. The peg should be inserted near the place where the ring has been removed, and the latter portion must be well covered with soil, and be kept frequently moistened.

Wiring, or Strangulation, refers to the Layering of branches which have had a wire strained tightly round them, so as to check the sap, and cause an accumulation of woody matter above the wire. Roots are not readily formed on this enlarged portion, when exposed to the air, but they usually appear when it is laid in soil, sometimes very soon. Pricking the bark through with a sharp instrument tends to encourage the production of roots. Tongueing and Ringing are both preferable to this method, where their adoption proves practicable.

Twisting is the same as simply Layering in the earth, excepting that the branch is twisted for the purpose of rending the sap-vessels. Many plants will not bear such treatment without breaking; consequently, it can only be practised in certain cases.

Piercing, like Twisting, refers to another plan of ordinary Layering, and differs only in detail. The branch, in this case, is pierced or punctured with some sharp instrument before being pegged and covered with soil. Clean cuts are always much better than bruises, and, for this reason, the removal of a notch on the under portion

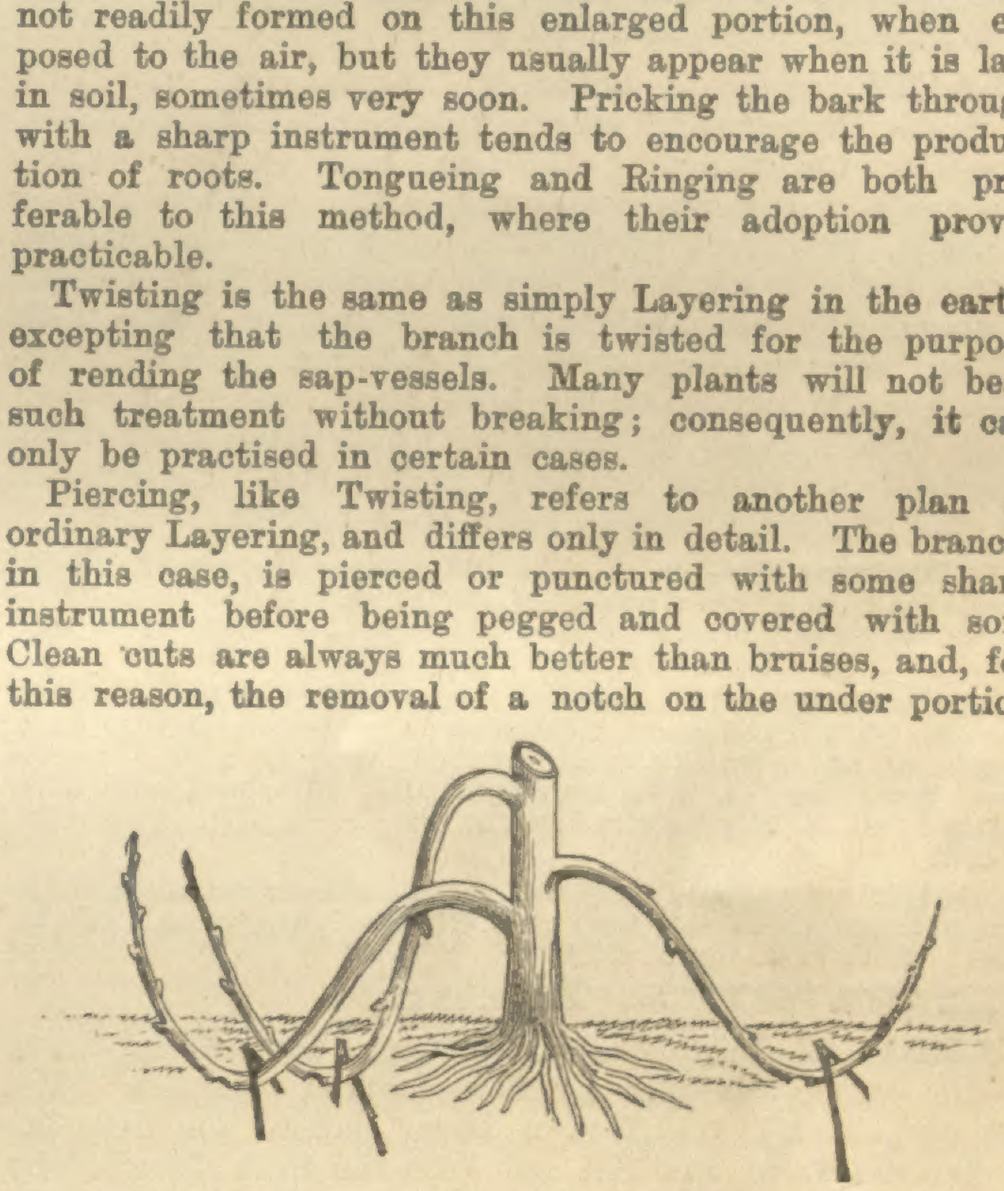

FIG. 384. LAYERING BY PIERCING OR NOTCHING.

of each layer (see Fig. 384) is, of the two, to be preferred.

Serpentine Arching is a method of Layering sometimes adopted for propagating plants with long, firm shoots. The shoot is brought to the ground and Layered in several places by one of the methods previously alluded to. The intervening spaces, or curves of the branch, should be furnished, above ground, with growing buds, so that each portion may ultimately be severed, to form a separate plant.

Layering by Insertion of the Growing Point is sometimes an available method, if others fail, or when roots are not readily emitted. Points of firm shoots, for instance, of scarce varieties of Currants, Gooseberries, or Rubus, if placed and secured in newly-dug soil, in summer, will form a quantity of roots by autumn, and will be furnished with a growing bud. In such cases, this method may be successfully utilised for propagating.

Circumposition is an old term applied to the Layering of plants whose branches are far from the ground, or, for various reasons, will not bend. It is still practised occasionally, but not to any great extent. The branch, in most cases, is either ringed, or has an incision made in it, and this part is placed inside a pot or box and surrounded with soil. An ordinary flower-pot, cut in two before being burned, answers well, as the two parts may

Layering—*continued.*

be placed together, and the branch allowed to enter at the bottom. The pot must be afterwards filled up with soil, and made secure, by some means, from falling apart or shifting about. A covering of moss over the pot tends to keep the soil moist, by preventing an undue evaporation, resulting from its suspension in the air. This is sometimes called the Chinese method of Layering, presumably on account of it being more generally adopted in China.

Some plants—Cordylines, for instance—will form roots readily in a moist stove, if an incision is made in a firm part of the stem, and some moss tied round, without soil. The moss must be kept syringed, and the old roots of the plant somewhat dry, until new ones are formed at the place desired.

Layers should, in all cases, be allowed to become well rooted before being detached.

LAYIA (named in honour of Thomas Lay, naturalist in Beechey's voyage). SYNS. *Eriopappus*, *Madaroglossa*. Including *Callichroa*, *Calliglossa*, and *Oxyura*. ORD. *Compositæ*. A genus comprising about a dozen species of hardy, pubescent or hirsute, often glandular, mostly annual herbs, natives of North America. Flower-heads heterogamous, pedunculate; rays yellow or white; disk yellow; achenes pilose or rarely glabrous. Leaves alternate, narrow, entire, or the lower ones rarely all pinnatifid. The species, not many of which have been introduced, thrive in any ordinary garden soil. Propagation may be effected by seeds, sown on a hotbed.

L. Calliglossa (Calliglossa). This differs from *L. chrysanthemoides* principally in having a pappus of usually several (ten to eighteen) unequal, rigid, subulate awns. California. SYN. *Oxyura chrysanthemoides* (under which name it is figured in B. R. 1850).

L. chrysanthemoides (Chrysanthemum-like). *fl.-heads* solitary, on sub-clavate peduncles, tomentose; ray-florets yellow at base, paler at apex, broad-oblong, trilobed; pappus none. August and September. *l.*, lower ones pinnatifid; uppermost ones quite entire; all slightly scabrous on the margin. *h.* 1½ft. California, 1834.

L. platyglossa (broad-tongued). This is the correct name of the plant described in this work as *Callichroa platyglossa*. (B. M. 3719; S. B. F. G. ser. ii. 373.)

LEADWORT. *See* **Plumbago.**

LEAF. A Leaf is an expansion of the cellular tissue of the stem, traversed by fibro-vascular bundles. The use of Leaves is to afford a large surface for exposing to the action of sunlight and heat the food absorbed by the plant, and thus cause assimilation; they also provide for evaporation, and absorb the carbonic acid of the air. The various terms employed in describing the shape, duration, and insertion, &c., of leaves will be found in their proper places in this work.

LEAF BUDS. *See* **Buds, Leaf.**

LEAFLET. One of the divisions of a compound leaf.

LEAF-MINERS. Many plants are liable to have their leaves mined by the larvæ of minute insects, which may belong to various groups—Beetles (*Orchestes Fagi* in Beech-leaves, &c.), Sawflies (species of *Fenusa*, &c.), Lepidoptera (species of *Lithocolletis*, &c.), and Diptera (species of *Phytomyza*, &c.). In general, the affected plants seem to suffer little harm from the existence of the mines, unless these are very numerous. This is fortunate, as the only remedy is to crush the larvæ in the leaf between the finger and thumb—a remedy not suitable for extensive application. *See also* **Celery Fly, Holly-leaf Fly,** and **Parsnip Fly.**

LEAF MOULD. Leaves, when thoroughly decayed, so that they readily separate into small particles, constitute what is termed Leaf Mould, a valuable manure in many instances, especially on heavy soils, and one of the most important ingredients for the soil used in the successful cultivation of the majority of pot plants. If of good quality, and free from injurious fungoid growths, it may

Leaf Mould—*continued.*

be used freely, particularly with tender seedlings and cuttings of soft-wooded subjects. The production of roots, in young plants of this description, is induced and accelerated with more certainty by planting in the material under notice than by the use of any other. The quality of Leaf Mould depends very materially on the sort of leaves composing it, and in the manner of preparation adopted. The best leaves are those collected from a wood, or other place, where the principal trees are Beech and Oak, and where their leaves fall over a large surface each year, and naturally decay slowly until those beneath the surface become changed into a light mould. In many instances, such Leaf Mould cannot be obtained, on account of the necessary removal of the leaves to preserve tidiness; but, on the other hand, its importance and additional value over that artificially prepared is insufficiently recognised in many places where quantities might be collected in woods. Leaf Mould of good quality may be used to the extent of about one-third in composts for Azaleas, greenhouse Rhododendrons, and many fine-rooted hard-wooded plants of this description. It may, with advantage, be freely incorporated along with peat in the preparation of beds for nearly all Ericaceous plants outside. Further, nothing is better suited for improving flower-beds, or for adding to soil of any description for placing round trees, shrubs, or plants, whose roots it is desired to encourage. If leaves have to be gathered into a heap for Leaf Mould, a place should be selected where they may be spread rather thinly, so as to avoid any excessive heating by fermentation. The whole should be turned over occasionally, so as to expose all parts in turn to the influence of the weather and air. Where air cannot reach leaves that are of a somewhat hard, dry texture, their decay is exceedingly slow, unless there are other substances intermixed to hasten decomposition. Water may be applied artificially for the purpose, but it never has the same effect as rain; and if a large heap is made, this latter cannot penetrate far into the interior. Leaves should be collected free from sticks, if possible, as these are liable to encourage fungoid growths, which, finding a suitable medium for increasing in the Leaf Mould, will, in due course, render it useless for plant cultivation. The time taken in reducing leaves to a mould or fine soil depends greatly on the amount of turning over, and other attention devoted to the preparation. Much may be done in one year, or even less; but the quality is usually better if a longer time than this is allowed.

LEAF PROPAGATION. The propagation of plants by their Leaves is a method of rapid increase adopted with great advantage in the case of those which succeed. An incision made in any firm part of the midrib, as well as the petiole, will, in certain instances, induce the production of a young plant. Ornamental-leaved Begonias, Gesneras, Gloxinias, and several succulent plants, are familiar examples of subjects largely increased by Leaf Propagation. Doubtless, many other sorts of plants might be similarly perpetuated, if their leaves remained fresh for a sufficiently long time to enable a callus to form. Leaves which are nearly fully matured, but still not too old, are preferable for propagating purposes; they will not succeed at all if very young. Merely pegging them on light soil, or covering very lightly, for preserving moisture, is generally sufficient, with the protection of a close frame or bell glass. Succulents, increased by Leaf Propagation, should have their fleshy leaves simply laid on or very lightly pressed into sand, and be kept nearly dry on a shelf until a small bulbil-like plant forms at the end of each, where it has been detached. The propagation of plants by leaves is generally limited to the petiole or ribbed portion. *Bryophyllum calycinum* is, however, an exception, as young ones spring, in this case, from the notches on the margin of the leaf.

LEAF-ROLLERS. By this name are denoted the larvæ of insects belonging to several different orders, and all of which may cause considerable injury to the trees and shrubs in gardens. To herbaceous plants they are less hurtful. The larvæ dwell in tubes, formed of the inrolled leaves, and are thus well protected against assaults from without. Many of them have the habit, when the plant on which they live is smartly shaken, of crawling from the leaf-tube, and lowering themselves, by a thread of silk, till the dreaded danger is past, when they pull themselves up by the thread, and re-enter the tubes. Advantage may be taken of this habit to shake them on to a sheet laid below; and from this they can be collected for destruction. The leaf is retained in an inrolled form by means of numerous short cables of silk, passing from surface to surface of the roll. Sometimes, the silk is fixed before the leaf has opened originally; but, in other cases, the larvæ have been seen at work fixing the threads and drawing the leaf into position. In the smaller proportion of cases, the inrolling of the leaf is due to swelling on one surface, brought about by the irritation caused by the action of the indweller or indwellers. The damage done may be confined to suction of the tissues in the interior of the tube, or these parts may be eaten away, and the leaf may thus be killed. The leading forms of Leaf-rollers are: (1) Moths, for the most part belonging to the group of Tortrices. The insects seldom reach 1in. in spread of wings; but they are at times so numerous as to more than make up for their small size individually. Their wings are generally rather broad, and are usually dark or some shade of brown. Some species almost strip trees of their foliage, *e.g.*, *Tortrix viridana* on Oaks. (2) The leaves of several of the cultivated Willows have the margins rolled in to form tubes, the agents being larvæ of Sawflies of the genus *Nematus*, or else Gall-midges, belonging to the *Cecidomyidæ*. (3) Certain Mites also, of the genus *Phytoptus*, roll the margins of the leaves of some kinds of plants, so as to form narrow tubes, in which they live for protection. Few cultivated plants have the leaves rolled by these Mites; though Hawthorn and Sloe occasionally have their leaves a good deal injured in this way.

LEAFSTALK. The (unexpanded) base of a leaf, connecting it with the stem.

LEAFY. Covered more or less with leaves; of the consistency of a leaf.

LEATHER JACKET. A common name for the grub of the **Crane Fly** (which *see*).

LEATHER-WOOD. *See* **Dirca palustris.**

LEAVENWORTHIA (named in honour of M. C. Leavenworth, an American botanist, who died in 1862). ORD. *Cruciferæ*. *L. Michauxii* thrives in any ordinary garden soil, and succeeds best when treated as a half-hardy annual. Propagated by seeds, sown in the open border, in spring.

L. aurea (golden) is quoted by Dr. Asa Gray as a mere synonym; it is described, however, as having yellow flowers, so would be a desirable variety, from a garden standpoint.

L. Michauxii (Michaux's). *fl.* rosy-lilac, with a yellow eye, freely produced on erect scapes. June. *l.* slender, lyrately-pinnatifid, tufted. *h.* 3in. United States, 1868. (B. M. 5730.)

LEBANON, CEDAR OF. *See* **Cedrus Libani.**

LEBECKIA (said to be derived from the native name of some of the species). ORD. *Leguminosæ*. A genus containing about twenty-four species of greenhouse shrubs, all natives of Southern Africa. Flowers yellow, in terminal, often unilateral racemes; bracts and bracteoles small and inconspicuous. Leaves linear-filiform, one to three-foliolate. Branches unarmed, slender, or much-branched and spinescent, glabrous or silky. Perhaps the only species now in gardens is *L. cytisoides*. Some of the plants formerly included here are now placed under *Aspalathus*, &c. For cultivation, *see* **Aspalathus.**

L. cytisoides (Cytisus-like). *fl.* bright yellow, large, on spreading longish pedicels. May. *l.* long-stalked, trifoliolate; leaflets linear-oblong, silky, canescent. *h.* 2ft. to 4ft. (B. M. 1699, under name of *Crotalaria pulchella*).

LEBRETONIA. Included under **Pavonia** (which *see*).

LECANIUM. Included under **Trichomanes** (which *see*).

LECANOPTERIS. Included under **Polypodium** (which *see*).

LECHENAULTIA. *See* **Leschenaultia.**

LECYTHIDEÆ. A tribe of *Myrtaceæ*.

LECYTHIS (from *lecythos*, an oil-jar; in allusion to the shape of the seed-vessels). ORD. *Myrtaceæ*. A large genus (sixty-four species have been described, but not so many are entitled to specific rank) of stove trees, sometimes very large. They are confined to tropical—mostly Eastern—America. Flowers often rather large, disposed in simple or paniculate, axillary, terminal racemes; calyx segments and petals six, rarely four, the former imbricated. Fruit coriaceous or woody, globular or cupuliform, furnished at top with a lid, which falls off when the fruit is ripe. Leaves alternate, coriaceous, entire or serrate, dotted. Few of the species are known to cultivation. They thrive in a mixture of loam and sand, and require a strong heat. Propagation may be effected by cuttings of the ripened wood, inserted in sand, under a glass. Under the name of Sapucai Nuts, the seeds of *L. Zabucajo* are sold in our shops as a substitute for Brazil nuts, to which they are far superior.

L. grandiflora (large-flowered). *fl.* 2in. in diameter; petals deep red, very hard; pedicels thick, shorter than the largest petal. April. *fr.* ovate, nearly globose, 4in. to 5in. in diameter; seeds edible and very palatable. *l.* petiolate, oval, acute, quite entire, stiff. *h.* 60ft. to 80ft. Cayenne, 1824.

LEDEBOURIA. Included under **Scilla** (which *see*).

LEDENBERGIA (a commemorative name). ORD. *Phytolaccaceæ*. A monotypic genus, the species being a very ornamental-leaved stove climbing shrub. It thrives in a compost of rich loam and leaf mould, and requires ample drainage and plenty of pot room. Propagated by cuttings, placed in sandy loam, under a hand glass, in gentle bottom heat.

L. roseo-ænea (rosy-bronze). *fl.* whitish, small, inconspicuous, disposed in long, drooping, axillary racemes. *l.* large, alternate, thick, obovate-lanceolate, dark shining coppery-green on the upper surface, and bright rosy-violet colour beneath. Stems and branches reddish-purple. Central America, 1869. (I. H. 591.)

LEDOCARPUM. A synonym of **Balbisia** (which *see*).

LEDUM (from *Ledon*, the ancient Greek name used by Dioscorides for the Cistus). Labrador Tea. SYN. *Dulia*. ORD. *Ericaceæ*. A small genus (four or five species) of very ornamental, dwarf, hardy evergreen shrubs, inhabiting the Frigid and Arctic regions of the Northern hemisphere. Flowers white, disposed in many-flowered terminal umbels; petals five, obovate, obtuse, spreading; stamens five or ten, rarely six or seven, exserted; pedicels bracteate at base. Leaves alternate, shortly petiolate, linear or oblong; margins recurved, entire, rusty underneath, coriaceous. Like most other so-called American plants, the species succeed best in well-drained beds of peat and leaf mould, to which sharp sand or road grit should be added. Propagated by seeds, but principally by layering, in sandy-peat soil, and by careful divisions of established plants in autumn and winter. Raising and establishing young plants takes some considerable time to accomplish. When transplanting Ledums, it is necessary to keep the ball of earth surrounding the roots as intact as possible.

Ledum—*continued.*

L. buxifolium. *See* **Leiophyllum buxifolium.**

L. canadense (Canadian). A synonym of *L. latifolium canadense.*

L. glandulosum (glandular). *fl.* white; inflorescence often compound and crowded calyx five-parted. *l.* oblong or oval, or approaching lanceolate, pale or whitish, and minutely resinous-dotted beneath. *h.* 2ft. to 6ft. North America.

L. latifolium (broad-leaved).* *fl.* white; stamens five, about the length of the corolla. April and May. *l.* linear-oblong, with

Ledum—*continued.*

replicate margins, clothed with rusty tomentum beneath. *h.* 1ft. to 3ft. United States, &c., 1763. A handsome shrub, the leaves of which are said to be a good substitute for tea. (L. B. C. 534.)

L. l. canadense (Canadian). *fl.* white, large, disposed in terminal umbellate corymbs. April and May. *l.* ovate, petiolate, white beneath. *h.* 3in. to 6in. Canada. SYN. *L. canadense* (under which name it is figured in L. B. C. 1049).

L. l. globosum (globose) is a garden form, superior to the type (G. C. n. s., ix. 698.)

FIG. 385. LEEA AMABILIS.

Ledum—*continued.*

L. palustre (marsh).* *fl.* white; stamens ten, longer than the corolla. April and May. *l.* linear, with revolute margins, clothed with rusty tomentum beneath. *h.* 2ft. Northern hemisphere, 1762. A smaller and narrower-leaved species than *L. latifolium.* (L. B. C. 560.)

LEEA (commemorative of James Lee, 1715-1795, a well-known nurseryman at Hammersmith, who did a good deal to popularise the Linnæan system). ORD. *Ampelideæ.* A genus of about a score species of stove shrubs or small trees, natives of tropical Asia and Africa, and the Mascarene Islands (rare in Australia). Flowers red, yellow, or green; inflorescence corymbosely cymose. Leaves alternate, usually very large, simple, or one, two, or three-pinnate. Tendrils absent. Leeas require a rich loam, and succeed best in a moist stove. Some of them are much grown in the tropics for the beauty of their fruits. Under cultivation, however, in this country, but few are worth growing. *L. amabilis* is a very handsome foliage plant.

L. amabilis (lovely).* *l.* unequally pinnate, on long channelled leafstalks; stipules large, leafy; leaflets in two or three pairs, stipellate, all more or less lanceolate, rounded at the base, acute or acuminate, sparingly serrate; upper surface of velvety texture, and deep bronzy-green colour, with a rather broad central white stripe irregularly indented at the margin; lower surface claret-red, with a translucent central green stripe. Borneo, 1880. See Fig. 385. (G. C. n. s., xvii. 493.)

L. coccinea (scarlet). *fl.* scarlet, in dense cymes. Summer. *l.* tripinnate, glabrous, dark green. Probably one of the dwarfest of the Leeas; it commences to flower when about 1ft. high. Tropical Asia. (B. M. 5299.)

LEE CHEE. *See* **Nephelium Litchi.**

LEEK (*Allium Porrum*). The Leek is a hardy biennial plant, cultivated for the use of the lower part of its leaves, which form a sort of elongated bulb (see Fig. 386). It has never been found in a wild state, and botanists who have studied the subject have confirmed the suspicions of Linnæus and the older authors that it is a cultivated form of the widely-distributed *A. Ampeloprasum.* Leeks, when well grown, and the stems thoroughly blanched, constitute an excellent and wholesome vegetable; they are also valuable as a potherb. Their extended cultivation in small gardens is confidently recommended, as in many—possibly in the majority—it is not at present attempted.

FIG. 386. LEEK.

Cultivation. Leeks are raised from seed, which should be sown thinly in a seed-bed, and lightly covered, about the middle of March. A small quantity may be sown earlier than this for using first, and a later sowing will form a succession. If sown thinly broadcast, as advised, but little after-attention will be necessary, with the exception of weeding, and an occasional watering, until June, when the plants of the main crop will be ready for transferring to their permanent quarters. An open situation is preferable, and a rich soil, such as that which has been manured the previous autumn. Transplanting should be performed in showery weather; or, if such does not obtain, the ground should be lightly turned over afresh, or be watered. Planting is practised in several ways; some growers prepare trenches, somewhat like those for Celery, and add soil for blanching as growth proceeds; and others make rather large, deep holes, wherein to plant. The latter is the easiest method, and the one most largely adopted. A distance of from 1ft. to 1½ft. should be allowed (according to the variety) between the rows, and the plants placed from 9in. to 12in. asunder. Holes should be made about 3in. in diameter, and a strong plant dropped upright in each, and merely watered in. The surrounding space may be filled in with soil when hoeing, after the plants are grown sufficiently to allow of it being performed without burying the crowns. When the trench system is adopted, earthing-up must be practised occasionally, to cause the blanching, which is obtained without it by the other method. The Leeks will be fit for use from September throughout the winter and spring. Any not used before April may be lifted, and their roots laid in soil, in a cool position, until required; this will prevent them running to seed. If seed is desired, some of the best plants should be selected, and placed in a warm situation about the beginning of March. The seed ripens in autumn, and the heads containing it may be cut when matured, and suspended in a cool, dry shed, until the following spring.

Sorts. London Flag is, perhaps, the best variety for general use; it has a tall, thick stem, and is largely cultivated. The Musselburgh, or Scotch Flag, is a large and hardy sort, with long, thick stems. Ayton Castle and Henry's Prize are large and fine varieties for exhibition. The Lyon Leek is a novelty recently distributed. It is stated to have been grown and exhibited with the blanched portion 20in. in length, and 4in. in diameter; the whole plant weighing over 4lb. This variety has been well grown in Scotland.

LEGUME. The fruit of leguminous plants (*Leguminosæ*). A solitary two-valved carpel, bearing its seeds on the ventral suture only.

LEGUMINOSÆ. A very large order of trees, shrubs, and annual or perennial herbs, distributed all over the globe. The order is divided into three large sub-orders, some of the principal characters of which are mentioned below.

The first of these sub-orders, *Papilionaceæ*, has a calyx of five sepals, which are more or less united; corolla perigynous, of five irregular petals (very rarely fewer), more or less distinctly papilionaceous, *i.e.*, with the upper petal (the vexillum or standard) larger than the others, and inclosing them in the bud; the two lateral ones (the alæ, or wings) exterior to the two lower petals, which last are commonly more or less coherent by their anterior edges, forming a body named the carina, or keel, which usually incloses the stamens and pistil. Stamens ten, rarely five, monadelphous, diadelphous (mostly with nine united into one set, and the tenth, or upper one, separate), or occasionally distinct. Ovary one-celled, sometimes two-celled by an intrusion of one of the sutures, or transversely two to many-celled by cross division into joints. Flowers perfect, solitary and axillary, or in spikes, racemes, or panicles. Leaves simple, or rarely compound, alternate; leaflets almost always quite entire. All the British representatives of the order *Leguminosæ* belong to the sub-order *Papilio-*

Leguminosæ—*continued.*

naceæ, and among illustrative exotic genera are: *Cladrastis*, *Desmodium*, *Phaseolus*, *Robinia*, *Wistaria*, &c.

Cæsalpinieæ have the corolla imperfectly or not at all papilionaceous, sometimes nearly regular, the upper or odd petal inside and inclosed by the others. Stamens ten, or fewer, commonly distinct. Illustrative genera are: *Cæsalpinia*, *Cercis*, *Gleditschia*, *Gymnocladus*, &c.

Mimoseæ have regular flowers, with corolla valvate in æstivation and exserted; stamens often very numerous. Illustrative genera are: *Acacia*, *Albizzia*, *Mimosa*, &c.

LEIANTHUS (from *leios*, smooth, and *anthos*, a flower; alluding to the absence of hairs on the flower). Including *Petasostylis*. ORD. *Gentianeæ*. A genus comprising ten species of glabrous stove herbs or shrubs, allied to *Lisianthus*, of which five are from the West Indies; the rest are natives of Mexico and Central America. Flowers yellowish-green or blackish, rarely white, often rather large; cymes sometimes loosely trichotomous, at others in corymbose clusters or umbellate; bracts foliaceous, involucrate; corolla narrow, funnel-shaped. Leaves opposite, petiolate, sessile, or amplexicaul. The species thrive in a compost of sandy peat and loam. Propagation may be effected by seeds, sown in a pot, and placed on a hotbed; or by cuttings of young shoots, inserted in sandy soil, under a bell glass.

L. exsertus (exserted). *fl.* yellow; stamens very long, exserted, flexuose. *l.* ovate-lanceolate, pedunculate, trichotomous. West Indies, 1793. Shrub.

L. longifolius (long-leaved). *fl.* lemon-yellow, long, drooping, on both axillary and terminal pedicels; tube funnel-shaped, the five lobes being at first spreading, and afterwards reflexed. August. *l.* lanceolate or oblong-lanceolate, acute, downy. Branches fastigiate, tetragonal. *h.* 1ft. to 2ft. West Indies, 1793. An evergreen sub-frutescent annual. (B. M. 4169.) SYN. *Lisianthus longifolius* (B. R. xi. 880).

L. l. cordifolius (heart-leaved). *l.* smaller than in the type, shortly petiolate; superior ones cordate-ovate. *h.* 2ft. West Indies, 1810. Annual.

L. nigrescens (blackish). *fl.* blackish, pendulous; panicles much branched, loose. July and August. *l.* decussate, lanceolate, acuminate, three to five-nerved. Branches terete. *h.* 11ft. Mexico, 1842. Annual. SYN. *Lisianthus nigrescens*. (B. M. 4043.)

L. umbellatus (umbellate). *fl.* green; umbels many-flowered, involucrate, axillary. May to July. *l.* obovate-lanceolate, acuminate; petioles connate. *h.* 10ft. Jamaica, 1843. Shrub. (B. M. 4243.)

LEIMANTHIUM. A synonym of **Melanthium** (which *see*).

LEIOCHILUS (from *leios*, smooth, and *cheilos*, a lip; in allusion to the smooth labellum). Erroneously spelt *Leochilus*. SYN. *Cryptosaccus*. ORD. *Orchideæ*. A small genus (four or five species) of stove epiphytal orchids, natives of the West Indies, Mexico, and Central America, closely allied to *Oncidium*, but differing in having the arms of the column placed below the stigma, and by the presence of a honey-pore at the base of the lip. Flowers usually yellow, small, racemose. Leaves oblong or narrow, flat, narrowed into the petiole. For culture, &c., *see* **Oncidium.**

L. carinatus (keeled). *fl.* panicled, on a long terete peduncle; sepals light copper coloured; petals with a deep copper coloured limb, and copper-coloured dots and streaks on a yellow disk; lip yellow, with white crests and chestnut spots and streaks on the disk. *l.* one to each pseudo-bulb, yellowish-green. Pseudo-bulbs ovoid, ancipitous. Mexico. (Ref. B. ii. 75.)

L. cochlearis (spoon-shaped). *fl.* pale yellow or purple-and-yellow variegated; lip obovate, blunt, crested at base; crest semi-lunar; scape pinnate, erect, simple or divided. *l.* short, oblong, pointed, variable in size, usually exceeded by the scape. West Indies, 1842.

L. oncidioides (Oncidium-like). *fl.* yellow-green, tinged with red, spreading, uniform, elliptical; lip lemon-colour, blotched with pale purple. April. Pseudo-bulb ovate or oblong-ovate, smooth, green, crowned with a single, oblong lanceolate, rather rigid, but scarcely coriaceous leaf, acute, and very obscurely striated. Mexico, 1840. (B. M. 3845, under name of *Oncidium macranthemum*).

L. sanguinolentus (bloody). *fl.* crimson. La Guayra, 1842.

LEIOPHYLLUM (from *leios*, smooth, and *phyllon*, a leaf; referring to the leaves being quite smooth). Sand Myrtle. SYNS. *Ammyrsine*, *Dendrium*, *Fischera*. ORD. *Ericaceæ*. A small, erect, bushy evergreen shrub, which thrives in a peat soil, or a very sandy loam. Propagated readily by layers, made in autumn; or by seeds, sown in pans and placed in a frame, care being taken never to allow them to want water.

L. buxifolium (Box-leaved).* *fl.* white, with pink tips and backs to petals, disposed in terminal corymbs. May and June. *l.* small, convex, oval, glabrous, shining. *h.* 6in. to 1ft. New Jersey and mountains of Virginia, 1736. SYNS. *Ammyrsine buxifolia* (under which name it is figured in B. R. 531), *Ledum buxifolium* (B. M. 6752). There are two or three distinct forms of this pretty little shrub.

LEIOSPERMUM. A synonym of **Weinmannia** (which *see*).

LEIOTULUS. A synonym of **Malabaila** (which *see*).

LEITNERIEÆ. A small and but little known order of shrubs, allied to the Walnuts, inhabiting Florida and Texas. It contains but one genus, *Leitneria*, and a couple of species.

LEMBOTROPIS SESSILIFOLIUS. A synonym of *Cytisus sessilifolius*.

LEMNA (an old Greek name, of uncertain meaning). Duckmeat; Duckweed. ORD. *Lemnaceæ*. A genus comprising seven species of small, floating herbs, distributed over Europe, Northern Asia, and North America, but rare in the tropics, five being natives of Britain. These plants are without distinct stems, or real leaves, "but consist of small, leaf-like fronds, either separate, or cohering two or three together by their edges, emitting, in most species, one or more fibres from their under surface into the water, and multiplying by similar fronds growing out of their edges. Flowers very rare, appearing from a fissure in the edge, or on the upper surface of the frond" (Bentham). The species are of no horticultural value. The pretty little Chilian *Nertera depressa*, with its red fruits, sometimes passes in gardens under the absurdly wrong name of Fruiting Duckweed.

LEMNACEÆ. A natural order of very small herbaceous plants, found floating freely on the surface of stagnant waters in all climates, but especially in temperate regions. Flowers achlamydeous, naked, or enclosed in a spathe, reduced to one or two stamens, accompanied by a sessile pistil. Lemnaceæ are the smallest known Phanerogams, and are allied to *Aroideæ* and *Naiadeæ*. There are two genera—*Lemna* and *Wolffia*—and twenty species.

LEMON. The fruit of **Citrus Limonum** (which *see*).

LEMON BERGAMOTTE. *See* **Citrus Limetta.**

LEMON GRASS. Several species of *Andropogon* are called Lemon Grass, viz., *A. citratum*, *A. Nardus*, and *A. Schœnanthus*. The proper name of the latter species is Ginger Grass.

LEMONIA. Included under **Ravenia** (which *see*).

LENS (the classical name). Lentils. ORD. *Leguminosæ*. A small genus (probably of not more than two or three species) of hardy, dwarf, erect or sub-scandent annuals, natives of the Mediterranean region, one of them (*L. esculenta*) being extensively cultivated in Southern Europe, Northern Africa, and the warmer parts of Asia. It is not much cultivated in this country, but will succeed, if desired, in a light soil and warm situation. Seeds should be sown, at the beginning of April, in drills about 1½ft. apart, and the plants allowed to grow on the ground. When the stems turn yellow, the plants should be pulled up, and left to dry in the sun. Seeds may be stored in the husks when ready, and will keep good a long time in a dry place.

Lens—*continued.*

FIG. 387. UPPER PORTION OF PLANT AND POD OF LENS ESCULENTA.

L. esculenta (edible). *fl.* pale blue, small, in long-stalked, few-flowered, racemose clusters. Summer. *l.* usually terminating in a long, simple or slightly-branched tendril; leaflets (about six pairs) narrowly lanceolate-oblong. *h.* 6in. to 18in. Native country unknown. One of the most anciently cultivated plants; it was well-known to the Egyptians and Persians, and has been grown in Europe since the days of the Roman Empire. The seeds (lentils) are highly valued as food, being amongst the most nutritious of vegetable substances. See Fig. 387.

LENTIBULARIEÆ. A natural order of dicotyledons, belonging to Lindley's bignonial alliance of perigynous exogens. Chiefly aquatic or marsh herbs, most abundant in the tropics. Flowers showy, irregular; calyx divided, persistent; corolla bilabiate; stamens two, included; anthers one-celled. Leaves radical, either undivided or cut into filiform root-like segments, bearing little bladders. There are four genera—the best known being *Pinguicula* and *Utricularia*—and about 180 species.

LENTICULAR. Lens-shaped.

LENTILS. The seeds of **Lens esculenta** (which *see*).

LEONOTIS (from *leon*, a lion, and *ous*, *otos*, an ear; in allusion to the fanciful likeness of the corolla to the ear of a lion). Lion's Ear. ORD. *Labiatæ*. A genus comprising about twelve species of greenhouse herbs or shrubs, mostly found in tropical and Southern Africa, one species being broadly dispersed through the Mascarene Islands and East Indies; also found in tropical America. Flowers red or yellow, sessile, often showy; helmet villose; corolla tube often exserted; limb bilabiate; whorls densely many-flowered, sometimes solitary at the tops of the branches. Nutlets ovoid-triquetrous, obtuse or truncate at apex, glabrous. Leaves dentate. The species, when well grown, are very ornamental, and are of easy culture in a rich loamy soil, if once properly established. Propagated by cuttings, which strike freely, in a gentle bottom heat, in early spring.

Leonotis—*continued.*

When rooted, they should be potted off, and shifted into larger sizes as becomes requisite; continual stopping will induce a bushy growth. The plants may be kept in the open air throughout summer, and removed to the greenhouse at the approach of autumn.

L. intermedia (intermediate). *fl.* bright fulvous or orange-yellow, hairy, in whorls of about thirty from the uppermost joints of the stem. September. *l.* wrinkled, on very long stalks, smoothish and opaque above, downy beneath; lower ones ovate-cordate, obtuse; upper ones lanceolate. Stems erect, remotely jointed. *h.* 4ft. Cape of Good Hope, 1822. (B. R. 850.)

L. Leonurus.* Lion's Tail. *fl.* scarlet, villous, 2in. long; whorls rather loose; calyx finely tomentose. Winter. *l.* oblong-lanceolate, bluntly serrated, tomentose beneath, and pubescent above. Branches tomentose. *h.* 3ft. to 6ft. Cape of Good Hope, 1712. Shrubby. SYN. *Phlomis Leonurus* (under which name it is figured in B. M. 478). (G. C. n. s., xix. 186.)

L. nepetæfolia (Catmint-leaved). *fl.*, corolla deep shining orange-scarlet, upper lip projecting far beyond the nether one; whorls distant, many-flowered. September. *l.* cordate, obtusely and deeply serrated, green, sub-tomentose; petiole the length of the leaves. *h.* 4ft. to 6ft. East Indies, 1778. (B. R. 281.)

LEONTICE (from *leon*, *leontos*, a lion; alluding to the fancied resemblance in the leaves to the print of a lion's foot). ORD. *Berberideæ*. A small genus (three or four species) of herbs, with tuberous rhizomes, natives of central Asia and South Europe. Flowers yellow, racemose; racemes sub-paniculate; sepals six to nine, petaloid; petals six, much shorter than the sepals, truncate at apex. Leaves twice or thrice pinnate or trisected, with rather thick segments; cauline ones few. *L. altaica*—the species best known to cultivation—is a half-hardy plant, succeeding in common soil. It may be increased by offsets, or by seeds.

FIG. 388. LEONTICE ALTAICA, showing Habit, detached Leaf, and Portion of Inflorescence.

L. altaica (Altaic). *fl.* about twelve, in terminal deflected racemes: pedicels one-flowered; petals erect, semi-cylindrical. April. *l.* solitary, petiolate; petiole tripartite, with spreading divisions, each bearing on its summit five elliptical, glaucous, unequal leaflets, on partial petioles. Stem erect, succulent, green at base. *h.* 3in. to 6in. Altai Mountains. See Fig. 388. (B. M. 3245.)

L. Chrysogonum. *See* **Bongardia Rauwolfii.**

LEONTODON (from *leon*, *leontos*, a lion, and *odons*, tooth; referring to the tooth-like margins of the leaves). Hawkbit. ORD. *Compositæ*. This genus comprises about forty species of hardy herbaceous plants, of which one is a native of North America, and the rest inhabit Europe, Central and Western Asia, and North Africa. Florets entirely strap-shaped, and surrounded by several rows of overlapping bracts; receptacle naked. Leaves spreading, toothed. None of the species are of any value horticulturally.

LEONTOPODIUM (the Greek name, given originally by Dioscorides; from *leon*, *leontos*, a lion, and *pous*,

Leontopodium—*continued.*

a foot; in reference to the flower-heads resembling the foot of a lion). Lion's Foot. ORD. *Compositæ*. A genus comprising five species of tufted woolly perennial herbs, of which three (probably varieties of one) inhabit the mountains of Europe, and extra-tropical Asia, and the

FIG. 389. LEONTOPODIUM ALPINUM.

others are natives of the Andes of South America. Flower-heads small, in dense cymes at the apices of the branches; floral leaves involucrate, clustered. Leaves, radical ones sub-spathulate; cauline ones alternate, entire. *L. alpinum*, the only species in cultivation, is a pretty

FIG. 390. FLOWER-HEAD OF LEONTOPODIUM ALPINUM.

hardy plant, which is largely collected for sale by the peasants in Switzerland, &c., under the popular title of Edelweiss. It succeeds in firm, well-drained sandy soil, on exposed parts of rockwork. New plants may be raised from seeds, annually, or the old plants may be divided,

Leontopodium—*continued.*

in spring. Seeds ripen but sparingly in this country in moist seasons, but are more freely produced when the summers are favourable. They must be kept in a dry place throughout the winter.

L. alpinum (alpine). Edelweiss.* *fl.-heads* terminal, enveloped in woolly bracts. June and July. *l.* white, woolly; lower ones lanceolate, narrowed into the stalk; cauline ones sessile, linear-oblong. *h.* 6in. Alps, 1776. See Figs. 389 and 390. (B. M. 1958, under name of *Gnaphalium Leontopodium*.)

LEOPARD MOTH. This insect is widely diffused in England, but is seldom very abundant. The moths, both male and female, have the ground colour white, semi-translucent on the wings, scattered thickly with blue-black roundish spots. The hind wings have the spots less distinct. The antennæ, in both sexes, are rather

FIG. 391. LEOPARD MOTH (ZENZERA ÆSCULI)—FEMALE.

short; in the female (see Fig. 391), they are thread-like, but in the male they are pectinate at the base on each side. The larva (see Fig. 392) is whitish, with black glossy spots, and has a blackish plate on the segment next the head. It feeds on the wood in the interior of the stems and branches of Pear, Apple, and Plum-trees; but the trees seem to suffer very little from its attacks, and Newman even remarks that the infested trees seem to bear larger crops of fruit than the healthy ones. The pupæ may be found in the galleries bored by the larvæ; they move readily along by means of rings of small spines on the hinder parts of the body. The moths appear

FIG. 392. CATERPILLAR OF LEOPARD MOTH.

about midsummer, and may be found on the tree trunks. The males are attracted by light, *e.g.*, to gas lamps. If desired, the larvæ may be killed in their burrows either by pushing down a strong wire, or by injecting a solution of soft-soap or tobacco-water. It has also been recommended to force fumes of sulphur or tobacco-smoke into the burrows. *See also* **Insects.**

LEOPARD'S BANE. *See* **Doronicum.**

LEOPOLDINIA PULCHRA. *See* **Cocos Weddeliana.**

LEPANTHES (from *lepis*, a scale, and *anthos*, a flower; scales flower-shaped, including the stem). ORD. *Orchideæ*. A genus comprising about forty species of stove epiphytal orchids, natives of the Andes of South and Central America, the West Indies, and Mexico. Allied to *Pleurothallus*. Flowers very small; peduncles often clustered; sepals spreading; petals small; lip often adnate to the base of the column, two-lobed. The two species described below are those best known to cultivation. For culture, *see* **Pleurothallus.**

Leontinum - See Gray for Natural Ord.

Lepanthes—*continued.*

L. calodictyon (handsome-netted). *fl.* yellow and red, very small. *l.* sessile, pale green, with rich brown veins. *h.* 2in. New Grenada, previous to 1861. (B. M. 5259.)

L. sanguinea (blood-coloured). *fl.* blood-coloured; peduncles aggregate, shorter than the leaf; sepals ovate, glandularly ciliated, as also the lip; lateral lobes of lip wing-formed, spreading, middle lobe three-lobed, pressed to the column. January. *l.* ovate, three-toothed. Jamaica, 1843. (B. M. 4112.)

LEPANTHUS. A synonym of *Heteranthera.*

LEPECHINIA (named after John Lepechin, a Russian botanist, who died in 1802). ORD. *Labiatæ.* A genus comprising three species of half-hardy Mexican herbs. Corolla yellowish or whitish; tube shorter than the calyx, naked within; limb shortly bilabiate; whorls six to ten-flowered, in dense terminal crowded spikes, or the lower ones, or sometimes all, scattered. Nutlets ovoid, smooth. Leaves rugosely dentate. The undermentioned species requires a loamy soil. Propagated by divisions of the plant in spring; or by cuttings of young shoots, placed under a hand glass, at the same season.

L. spicata (spiked). *fl.* yellow, small; whorls crowded into terminal oblong or subglobose spikes, 1in. to 1½in. long. Summer. *l.* nearly sessile, 2in. to 6in. long, ovate, obtuse, crenulated, wrinkled. Stem erect. *h.* 1ft. to 1½ft. Mexico, 1800. (B. R. 1282.)

LEPERIZA. The plants formerly placed in this genus are now included, by Bentham and Hooker, under **Phædranassa** and **Urceolina** (which *see*).

LEPICYSTIS. Included under *Polypodium.*

LEPIDAGATHIS (from *lepis*, *lepidos*, a scale, and *agathis*, a ball; referring to the curved inflorescence, and the flowers being placed between the scaly bracts). ORD. *Acanthaceæ.* A genus comprising about fifty species of herbs or sub-shrubs, natives, for the most part, of the East Indies, the Malayan Archipelago, and tropical Africa, with two inhabiting tropical America. *L. cristata*, probably the only species yet introduced, is a stove evergreen shrub, thriving in any light, rich soil. Cuttings of young shoots will root during May, if inserted in sandy soil, and placed in bottom heat.

L. cristata (crested). *fl.* purple. June. *l.* linear-lanceolate or oblong, glabrous. *h.* 2ft. India, 1820.

LEPIDIUM (*Lepidium*, Greek name used by Dioscorides: it is a diminutive of *lepis*, a scale, and probably alludes to the form of the pods). Pepperwort. ORD. *Cruciferæ.* A genus comprising from sixty to eighty (by some authors estimated at 100) species of herbs or sub-shrubs, widely dispersed, and of variable habit. Flowers white, small, racemose, ebracteate. Leaves variable. The species are valueless as ornamental subjects; but the undermentioned is an esteemed salad plant.

L. sativum (cultivated). Common Garden Cress. *fl.* white. June. Pods orbicular, winged. *l.* variously cut and divided. Branches not spiny. *h.* 1ft. to 1½ft. Probably a native of Persia, &c., 1548. An erect branched smooth hardy annual. (Sy. En. B. 155.) *See also* **Cress, Garden.**

LEPIDOCARYA. A synonym of **Parinarium** (which *see*).

LEPIDOPTERA. This order of insects includes the butterflies and moths alone. It is well characterised by the four large membranous wings, covered with small scales, and by the entirely suctorial mouth; in the latter, the jaws are adapted to form a long tube, which, when not in use, is spirally coiled away below the head. The larvæ are known as caterpillars, and possess six true legs on the front segments, besides a variable number of prolegs or fleshy legs behind. They feed almost always on plants, and are often very destructive (*see* **Hawthorn Caterpillars, Hybernia,** &c.). The pupæ are almost motionless, and are often inclosed in a cocoon of silk, earth, or other material. The limbs in the pupæ are closely bound down to the body (obtected). The Lepidoptera are divided into two great groups: *Diurni*,

Lepidoptera—*continued.*

or butterflies, with antennæ usually clubbed at the tip; wings usually erect in repose, not connected by a spine and hook; pupæ usually naked and often angular; almost all are day fliers. *Nocturni*, or moths, with antennæ pointed at tip; wings connected by a spine and hook, usually horizontal in repose; pupæ more rounded than pupæ of the Diurni, almost always in a cocoon; mostly nocturnal in their habits. The larvæ of this group are more frequently injurious than those of the Diurni.

LEPISMIUM. This genus is now included, by the authors of the "Genera Plantarum," under **Rhipsalis** (which *see*).

LEPTANDRA. Included under **Veronica** (which *see*).

LEPTINELLA (from *leptos*, slender, small; on account of the habit and size of the plants). ORD. *Compositæ.* A genus (now included, by Bentham and Hooker, under *Cotula*) consisting of about eighteen species of hardy, mostly perennial, herbs, inhabiting Australia, New Zealand, and the Antarctic regions. Flower-heads rather small; receptacle at length conical; corollas yellow; achenes glabrous. Leaves alternate, pinnatifid or pinnately dissected, rarely undivided or toothed. *L. dioica* makes a pretty summer carpet of dark green slightly pinnatifid leaves, and is much used for carpet bedding. For culture of the three species described below, *see* **Paronychia.**

L. dioica (dicœcious).* *fl.-heads* pale yellowish (male and female similar), small, on slender scapes, which may equal leaves in length. Summer. *l.* stalked, dark green, 1in. to 2in. long, linear or spathulate, obtuse, semipinnatifid. Stems creeping, rather stout, short. *h.* 2in. to 3in. New Zealand.

L. lanata (woolly). *fl.-heads* ¼in. in diameter; involucre fleshy, three or four-seriate, glabrous, glandular, elliptic-rotundate; peduncles shorter than the leaves. *l.* petiolate, oblong, obtuse, pinnatifid; segments acute, the margins of the upper ones pinnatifid-serrate; base sheathed. Stem prostrate. Lord Auckland's Islands.

L. plumosa (feathery). *fl.-heads* solitary, about ¼in. in diameter; receptacle naked, conical; involucre one-seriate; peduncles terminal and lateral, solitary, elongated, slender, as long as the petioles. *l.* long-stalked, linear-oblong, obtuse, tripinnatifid; segments ultimately subulate. Lord Auckland's Islands. Plant softly and loosely hairy.

LEPTOCERAS. Included under *Caladenia.*

LEPTOCHILUS. Included under *Acrostichum.*

LEPTOCIONIUM. Included under *Hymenophyllum.*

LEPTODACTYLON. Included under **Gilia** (which *see*).

LEPTODERMIS (from *leptos*, slender, and *derma*, the skin; in reference to the thin bark). ORD. *Rubiaceæ.* A genus comprising three or four species of evergreen branching shrubs, natives of the Himalayan Mountains and Eastern Bengal, with one inhabiting North China. Flowers white or pink, at the apices of the branches or branchlets, shortly axillary, sessile. Leaves opposite, shortly petiolate, lanceolate. Branches twiggy, terete. *L. lanceolata*, the only species yet introduced, is a greenhouse shrub, allied to **Hamiltonia** (which *see* for culture).

L. lanceolata (lanceolate). *fl.* white, scentless, sessile by threes at the ends of the branches; involucre calyciform, of two leaves; corolla funnel-shaped, scabrous. June. *l.* lanceolate, attenuated, acute, membranous, villous; stipules triangular, villous. Branches quadrangular, downy while young. *h.* 6ft. Nepaul, 1842.

LEPTOGRAMME. Included under *Gymnogramme.*

LEPTOMERIA (from *leptos*, slender, and *meris*, a part; referring to the slender and almost leafless shoots). ORD. *Santalaceæ.* A genus comprising fourteen species of greenhouse shrubs, limited to Australia. Flowers minute, in little terminal or lateral spikes, racemes, or clusters. Branches numerous, slender, or rigid, apparently leafless. Leptomerias thrive in a compost of sandy peat and fibry loam, to which may be added a few pieces of charcoal. Propagated by cuttings of firm young shoots, placed in sand, under a bell glass. In all proba-

Leptomeria—*continued.*

bility, the species described below is the only one yet introduced.

L. Billardieri (Labillardière's). *fl.* white, very minute, disposed in numerous spikes. *fr.* greenish-red, fleshy, edible. Branches erect, very slender. *h.* 6ft. 1823.

LEPTOPLEURIA. Included under *Dicksonia.*

LEPTOPTERIS (of Blume.) A synonym of **Gelsemium** (which *see*).

LEPTOPTERIS (of Presl). *See* **Todea.**

LEPTOPYRUM. Included under **Isopyrum** (which *see*).

LEPTOS. In Greek compounds this signifies slender, graceful; hence, *leptophyllus*, slender-leaved.

LEPTOSIPHON. Included under **Gilia** (which *see*).

LEPTOSPERMUM (from *leptos*, slender, and *sperma*, a seed; seeds slender). Including *Fabricia.* ORD. *Myrtaceæ.* This genus comprises about twenty-five species of greenhouse or half-hardy shrubs, rarely small trees, mostly natives of Australia. Flowers usually white, sessile, or rarely shortly pedicellate, solitary, or two or three together, at the ends of short branchlets, or in the axils of the leaves. Leaves alternate, small, rigid, entire, nerveless, or one or three-nerved. Leptospermums thrive in a compost of loam and peat, to which may be added a small quantity of sand and charcoal. Propagated by cuttings of young shoots, placed in sand, under a glass, during May; or by seeds, sown in gentle heat, during March. The species are not very generally cultivated.

L. ambiguum (ambiguous). A synonym of *Kunzea corifolia.*

L. attenuatum (thin). *fl.* white, usually two on a short silky peduncle; calyx tube densely silky-pubescent. Summer. *l.* linear-lanceolate, acute. *h.* 3ft. to 6ft. Australia, 1795.

L. flavescens (yellowish). *fl.* white; calyces glabrous. Summer. *l.* linear-lanceolate, obtuse, dotted. *h.* 4ft. to 6ft. Australia, 1758.

L. f. grandiflorum (large-flowered). *fl.* white, large; calyces villous, with coloured teeth. Summer. *l.* lanceolate, narrowed at both ends, mucronate. *h.* 4ft. to 6ft. Australia, 1803. (L. B. C. 514.)

L. f. obovatum (obovate). *fl.* white; calyces glabrous, with coloured teeth. Summer. *l.* obovate, emarginate, glabrous. Branches angular, a little winged. *h.* 3ft. to 6ft. Australia.

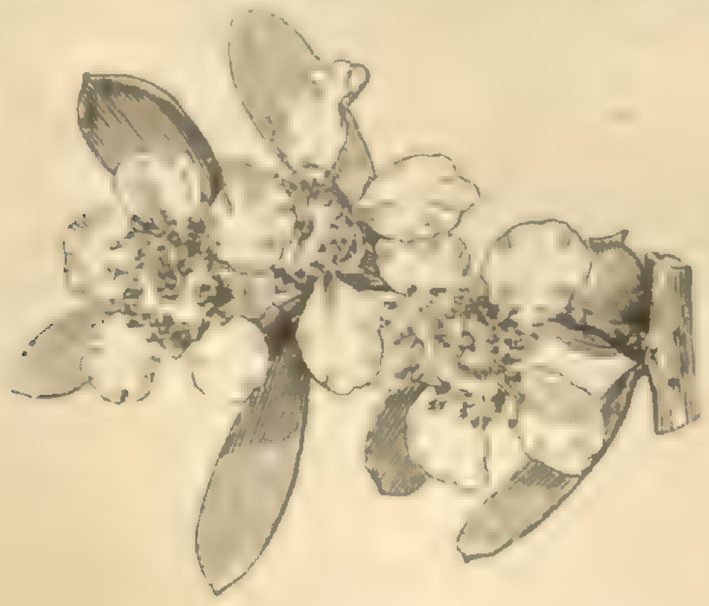

FIG. 393. FLOWERING BRANCHLET OF LEPTOSPERMUM LÆVIGATUM.

L. lævigatum (smooth). *fl.* axillary, solitary and sessile, or nearly so, or very rarely two together, on a common peduncle. *l.* from obovate-oblong to oblong-cuneate, or narrow-oblong, obtuse, mostly ¼in. to ½in. long. *h.* 20ft. to 30ft. Australia. SYN. *Fabricia lævigata.* See Fig. 393. (B. M. 1304.)

L. lanigerum (wool-bearing). *fl.* white; calyces very villous, from spreading pili. Summer. *l.* oblong or oval, mucronate, pubescent on both surfaces, or only beneath. *h.* 3ft. Van Diemen's Land and Australia, 1774.

L. myrtifolium (Myrtus-leaved). *fl.* rather small, all, or nearly all solitary, sessile and axillary. *l.* usually small, obovate or oblong, flat or concave, nerveless, or one or three-nerved. *h.* 8ft. to 10ft. Australia.

Leptospermum—*continued.*

L. scoparium (Broom-like). *fl.* reddish-lilac; calyces glabrous Summer. *l.* ovate, mucronate. *h.* 4ft. to 6ft. New Zealand, 1772 and 1876. The leaves of this species are used as tea. There is a variety of this, *grandiflorum*, figured in B. M. 3419.

L. s. juniperinum (Juniper-like). A narrow-leaved form, agreeing with the type, except in the foliage.

LEPTOSYNE (from *leptosein*, slenderness; a name applicable to the original, but not to most of the species, except as to the leaves and their divisions). ORD. *Compositæ.* A genus (now included, by Bentham and Hooker, under *Coreopsis*, but regarded as distinct by Dr. Asa Gray) containing about seven species of New World annual or perennial, herbaceous or suffruticose, smooth and glabrous plants, with showy pedunculate heads—the ray and disk being both bright yellow—and pinnately divided or dissected leaves. They have the habit of *Coreopsis* (which they represent on the Western side of North America), "but mostly with pistillate rays, and always with a ring on the tube of the disk corollas, or at its juncture with the throat" (Gray). For culture, *see* **Coreopsis.**

L. calliopsidea (Calliopsis-like). *fl.-heads* rather large and broad, with peduncles a span long. Autumn. *l.*, lobes narrowly linear, sometimes incised. *h.* 1ft. to 2ft. California. Annual. (R. H. 1873, 330, under name of *Leptosyne maritima.*)

L. maritima (maritime). *fl.-heads* large; rays sixteen to twenty, 1in. or more long; disk generally 1in. in diameter. Autumn. *l.* bipinnately divided into narrowly linear lobes of a line or two in width. *h.* 1ft. Perennial. (B. M. 6241, under name of *Coreopsis maritima.*)

L. maritima, of "Revue Horticole" (maritime). A synonym of *L. calliopsidea.*

LEPTOTES. Included under **Tetramicra** (which *see*).

LESCHENAULTIA (named after L. T. Leschenault, 1773-1826, a French botanist and traveller). Formerly spelt *Lechenaultia.* ORD. *Goodenovieæ.* A genus comprising sixteen species of very ornamental greenhouse herbs, under-shrubs, or shrubs, confined to Australia. Flowers blue, white, yellow, red, or greenish, either solitary and terminal or leaf-opposed, or several in compact, leafy, terminal corymbs; corolla oblique, the tube slit open to the base, or rarely closed, the lobes all or partially erect, and connivent or spreading. Leschenaultias are amongst the most beautiful and effective of greenhouse hard-wooded plants. Their successful cultivation requires the most careful attention at all seasons, particularly in regard to watering. They are propagated from cuttings, which should be taken, in spring or summer, from the points of shoots that are moderately firm, and inserted in well-drained pots of very sandy peat, under a shaded bell glass, in a little heat. Established plants will sometimes require a little stopping, to insure a symmetrical habit. This should be seen to so soon as flowering is over; and, if it is necessary, a few small stakes may be used for training or supporting the branches left. The soil used in potting or re-potting should consist of fibry peat and silver sand. It is very important that the stem of the plant should not be buried, or placed so as to be lower than the surrounding soil. A rather close frame will be best for a time, after the roots have been disturbed; but a light, airy situation should be afforded at all other times. The plants should not be exposed in the open air to ripen their growth; this treatment is generally injurious, if not fatal to them, although it is beneficial to many other plants of a hard-wooded, but much stronger-growing nature. If a light, sunny position, under glass, is selected for their cultivation throughout the autumn and winter, ripening of the wood may fairly be expected, and the plants will be uninjured by alternate heavy rains and drying winds. Only soft water should be used for watering, and it should be judiciously administered at all times. *L. biloba major* is perhaps the finest blue-flowered hard-wooded shrub in cultivation, and *L. formosa* is an exceedingly handsome species. The species described below are those best known to cultivation.

Leschenaultia—*continued.*

L. arcuata (arched). A synonym of *L. linarioides.*

L. Baxteri (Baxter's). A synonym of *L. formosa.*

L. biloba (two-lobed).* *fl.* blue; corymbs few-flowered; segments of corolla cuneated, deeply two-lobed, with a mucrone between them. June to August. *l.* linear-obtuse. Stem branched. *h.* 1ft. 1840. Shrub. SYNS. *L. Drummondi, L. grandiflora.* (B. R. 1841, 2.) The form *major* is a very desirable one, being somewhat larger, in all its parts, than the type.

L. chlorantha (greenish-flowered). *fl.* similar to those of *L. formosa*, but pale green in colour; the two upper connivent lobes of the corolla are acuminate, and more or less recurved. *l.* ¼in. to ½in. long. A low, diffuse, much-branched shrub, with the habit of *L. formosa*, of which it is probably only a variety.

L. Drummondi (Drummond's). A synonym of *L. biloba.*

L. formosa (handsome).* *fl.* scarlet, axillary, solitary, bractless, drooping; upper lip of corolla rounded, entire; lower ones tripartite. June to September. *l.* linear. *h.* 1ft. 1824. Shrub. SYNS. *L. Baxteri, L. multiflora* (L. B. C. 1579), *L. oblata.* (B. M. 2600; B. R. 916.)

L. grandiflora (large-flowered). A synonym of *L. biloba.*

L. laricina (Larch-like). *fl.* scarlet; corymbs three to five-flowered; corolla having the tube hairy inside at the bottom; segments spreading, two-lobed. June to August. *l.* filiform, compressed, apiculate. Stem branched. *h.* 1ft. 1844. Shrub. SYN. *L. splendens* (under which name it is figured in B. M. 4256).

L. linarioides (Toadflax-like). *fl.* yellow, terminal; corolla large, with three broad spreading bifid segments and two smaller entire ones. August. *l.* scattered, filiform. Stem branched. 1844. Shrub. SYNS. *L. arcuata* (B. M. 4265), *Scævola grandiflora.*

L. multiflora (many-flowered). A synonym of *L. formosa.*

L. oblata (oblate). A synonym of *L. formosa.*

L. splendens (splendid). A synonym of *L. laricina.*

LESPEDEZA (named after D. Lespedez, once Governor of Florida, and a great patron of botany). ORD. *Leguminosæ.* This genus comprises about twenty-five species of annual or perennial herbs, shrubs, or sub-shrubs, distributed over North America, temperate Asia, the mountains of the East Indies, and the Archipelago, and also in Australia. Flowers purplish, rose or white, borne in axillary clusters or racemes, or terminal panicles; calyx lobes nearly equal, or the upper two shortly united; standard orbicular, obovate or oblong, narrowed into a claw; wings free; keel obtuse or beaked. Leaves pinnately trifoliolate, rarely one-foliolate; leaflets entire, exstipellate; stipules free. Several species have been introduced; but, except *L. bicolor*, they are but rarely seen in cultivation.

L. bicolor (two-coloured). *fl.* rosy-purple, numerously produced in long pendulous branched panicles. *l.* glabrous, with oblong leaflets. *h.* 4ft. to 6ft. North China and Japan. SYN. *Desmodium penduliflorum.* (B. M. 6602.)

L. reticulata (netted). *fl.* violet; peduncles few-flowered. *l.*, leaflets varying from oval-oblong to linear, whitish-downy beneath, with close-pressed pubescence. North America. There are several varieties, the principal of which are:

L. r. angustifolia (narrow-leaved). *fl.* closely clustered on straight branches. *l.* crowded; leaflets narrowly oblong or linear, often silky.

L. r. divergens (diverging). *fl.* loosely panicled. *l.*, leaflets oval or oblong.

L. r. sessiliflora (sessile-flowered). *fl.* principally on peduncles much shorter than the leaves.

LESSER MAY BUG. *See* **May Bugs.**

LESSERTIA (named after Benjamin de Lessert, of Paris, 1773-1847, author of "Icones Plantarum"). ORD. *Leguminosæ.* This genus comprises about thirty species of greenhouse herbs or sub-shrubs, natives of the Cape of Good Hope. Flowers pink or red, rarely white, in axillary pedunculate racemes; vexillum sub-orbiculate, spreading or reflexed, naked within; claw short; wings oblong; keel upright or incurved, obtuse, often shorter than the vexillum. Leaves impari-pinnate; leaflets entire, exstipellate. Probably the species here described is the only one now in cultivation. It thrives in a loam and peat compost. Propagated by seeds, or by divisions, in spring.

L. perennans (enduring). *fl.* with a pale base and red or purple apex, numerous, drooping; racemes longer than the leaves, loose, elongated, pedunculate. August. *l.*, leaflets oval, silky beneath, pubescent above. *h.* 1ft. 1776. Herbaceous perennial. (B. M. 6106.)

LETTSOMIA. Now included under *Freziera.*

LETTUCE (*Lactuca sativa*). The Lettuce is a hardy annual, which has been extensively cultivated in this country since, and most likely long previous to, 1562. Botanists agree in looking upon the garden Lettuce as a cultivated race which has originated from *L. scariola.* The old Greeks and Romans cultivated the Lettuce as a salad plant (Theophrastus mentions three varieties), and in the Orient it was, perhaps, grown at a still more remote period. There are two distinct types, termed respectively Cabbage and Cos varieties. The latter may have been introduced from the Greek Archipelago or the Levant, as it derives its name from an island there, originally known as Cos. Cabbage Lettuces are distinguished by their broad, rounded leaves, forming a low, spreading head nearly close on the ground (see Fig. 394). Cos varieties grow upright, and the leaves are more of an

FIG. 394. CABBAGE LETTUCE.

FIG. 395. COS LETTUCE.

oblong shape (see Fig. 395). Lettuces, especially good Cos varieties, are very popular, and amongst the most useful of salading plants. To insure crisp, thoroughly-blanched hearts, it is necessary, with some sorts, to close the outer leaves together, and tie them. There are others which overlap, and do not require this attention to secure the desired end. Acres of land are devoted to the first spring crop in the neighbourhood of large towns, the demand for a supply of Lettuces being very great at this season. There are few gardens in which some are not grown according to requirements, and, practically, none in which a few would not be acceptable.

Cultivation. Lettuces are in request nearly all the year

Lettuce—*continued.*

round, in places where they are procurable. The spring and early summer supply is, perhaps, generally the most important. The most successful method adopted with plants for this crop is to sow in frames about the middle of September, and again in October. The frames should be prepared some time in advance, by having a bed of fermenting material, from 1ft. to 2ft. thick, placed beneath them, and the inside filled up to within 1ft. of the glass. About 6in. of light soil should be laid over the surface, after the manure has been evenly trodden down. Fermenting material admits of free passage for water, and, consequently, keeps the plants well drained; its heating properties are not required. Seeds may be sown broadcast, and the sashes kept on until germination takes place, when air should be freely admitted in fine weather. When the plants are large enough to handle, the weakest should be thinned, so as to leave the others about 2in. apart. But little water will be required during the winter, the object being to induce a hardy and sturdy growth, and prevent damping. This latter is chiefly to be guarded against in winter time, as it frequently causes much injury. Frost should merely be excluded by coverings of dry litter, or similar material, and this should be removed by day on all favourable occasions. Growth may be encouraged as the days lengthen, and the plants be gradually inured, and placed outside in February, where they are intended to grow. The state of the weather, and the severity of the season, must be taken into consideration, as these may vary each year, and cause special arrangements to be made.

Lettuces like a rich, rather light, soil, which should be manured deeply down, where the roots are situated. A distance of about 1ft. apart each way allows sufficient space for the plants to develop. If dibbers are used, the holes should be well filled in, either at the time of planting, or afterwards with a hoe. Growers of early Lettuces on a large scale are particular in filling dibber-holes from the south or sunny side, as, although apparently a trifling matter, the plants are found to succeed much better than when the reverse plan is adopted. Frequent hoeings in fine weather greatly encourage growth, and also prove beneficial in keeping down weeds and destroying slugs, which always prove very destructive to young Lettuces.

In mild and favourable localities, the foregoing method of winter cultivation and protection is not generally followed; hardy varieties being selected and grown on south borders outside. When intended for outside culture, they should be sown a month or more earlier than when frames are to be used for winter protection, in order that the plants may be large, and better able to withstand frost and wet. A sheltered border, sloping to the south, should be selected, and none but hardy varieties grown, such as the Hammersmith Hardy Green Cabbage, and Brown or Bath Cos. In many gardens, these varieties are sown about the middle of August, and the plants transferred, during the autumn, to any warm or sheltered positions; the foot of a south wall being usually one amongst others selected. Cabbage varieties may be placed from 6in. to 9in. apart, and a reserve stock should be kept in the seed-bed for filling up any blanks that occur. If some of the plants from this sowing are placed 6in. apart, on an old hotbed, under glass, and kept protected during winter, they will prove useful in spring, before those grown outside are ready.

Seed sowing of Lettuces in spring should be commenced in a warm frame about the end of January, or early in February, and be repeated at the end of the latter month for a succession. Small plants thus raised must be pricked out under hand glasses, or on a spent hotbed, until they are sufficiently strong for placing in the open ground. From the middle of March until August it is

Lettuce—*continued.*

advisable to make successional sowings, according to requirements, in open borders, at intervals of two or three weeks; then, if one lot should run to seed quickly, because of hot weather, another will soon be coming on. Timely thinning in the seed-bed is very important, as the plants, if once allowed to draw, never do so well afterwards. Few positions are unsuited for Lettuces in summer, provided they are attended to, by careful planting and watering at first, and there is sufficient light to prevent the leaves drawing up instead of forming close hearts. In small plantations, it is preferable to transplant with a trowel in summer time, to prevent a severe check being caused by injury to the roots. Advantage should always be taken of cloudy weather, if possible, for the operation. Any of the autumn crops may be lifted before the appearance of frost, and re-planted, rather closely, in any spare frame or house, free from drip, and where frost is merely excluded. By adopting this method of preservation, the season of supply may be considerably prolonged.

Seed-saving. Where it is desirable to save seed, the finest specimens should be selected for the purpose, such as form good hearts, and do not previously show a disposition to seed early. Different varieties must be kept isolated, or separated in some way, when in flower, to keep the product true to the original character. The parts which flower, and, consequently, ripen the seeds first, produce the best; and they should be secured in preference to waiting for the ripening of the whole lot. If the branchlets are collected, and laid on a cloth in the sun, when the seeds are in a forward state, the latter soon ripen, and may be rubbed out. Seeds may keep good for three or four years, but they are always considered best the second year, and should be tested before being depended on afterwards.

Sorts. The names of these are extremely numerous; but large numbers of supposed sorts, when grown under similar conditions, have been found synonymous, or insufficiently distinct to merit their separate names. The following is a list of good varieties in each class; those marked with an asterisk are specially recommended.

Cabbage Lettuces. *ALL THE YEAR ROUND, very hardy, compact, and of good quality. BROWN DUTCH, much like the White Dutch, except that the leaves are more brown where exposed; it forms a good-sized head, which blanches white, and is of excellent quality. *EARLY PARIS MARKET, a valuable early sort, much grown in France. *HAMMERSMITH HARDY GREEN, leaves thick, dark green, wrinkled; one of the hardiest and most extensively grown sorts of this class. LARGE WHITE, heads large, somewhat flattened, withstands hot weather well; a good sort for summer use. MALTA, heads flat, compact, blanches well; leaves pale green, somewhat soft. *NEAPOLITAN, heads large, firm, and crisp, habit dwarf; a good variety, of excellent quality, considered the best for summer. STANSTEAD PARK, compact, good for autumn sowing, with light protection in winter; very similar to White Dutch *TENNIS BALL, small sort, forming close hearts, which are white and crisp. TOM THUMB, very compact and of excellent quality; good for all seasons. *WHITE DUTCH, a hardy sort, which hearts readily; larger than Hammersmith Hardy Green.

Cos Lettuces. ALEXANDRA WHITE, of immense size, crisp, fine flavoured. *BROCKET HALL BROWN, hardy, and of excellent flavour; stands a long time before running to seed. *BROWN OR BATH BLACK-SEEDED, large, hearts well when tied up; a very hardy variety, the best of all for standing the winter. EARLY GREEN, tolerably hardy variety, smaller but a little earlier than Paris Green. *MOOR PARK, large and crisp, hardy, and not liable to run to seed. NUNEHAM PARK, solid and crisp, grows to a large size. *PARIS GREEN, resembles Paris White, except that it is hardier; the leaves are dark green before being blanched; an excellent variety, requiring no tying. *PARIS WHITE, large, heart very white, crisp, and excellent; blanches well without tying; generally esteemed as the best summer Cos variety in cultivation. SUGARLOAF, good hardy variety for autumn sowing; requires no tying.

Injurious Insects. In common with most salad herbs and potherbs, Lettuce suffers from the ravages of many kinds of larvæ; and it is also the chosen food of a few insects. The roots are eaten by the larvæ of Click Beetles (Wireworms) and of Cockchafers (May Bugs).

Lettuce—*continued.*

The leaves are devoured by the caterpillars of not a few of the larger Moths, including the Tiger Moth (*Arctia Caja*) and its allies, and the genera *Agrotis*, *Noctua*, *Mamestra*, *Plusia*, and other thick-bodied night moths. For the methods of destroying such larvæ, *see* **Insects, Surface Caterpillars,** and **Tiger Moth.** The Lettuce Fly (*Anthomyia Lactucæ*), in the maggot stage, feeds on the fruits, eating out the seeds, and thereby destroying the harvest when plants are grown for seed. The maggots are footless, tapering near the head, truncate and toothed at the tail, dirty yellowish-white, and a little over ¼in. long when full grown. In the Lettuce head, or on the ground, they turn to pupæ, oval in form, and red-brown in colour. The flies emerge from the pupæ in early summer. They are about the size of a house-fly, and are rich brownish-black, with brown wings. Infected seed should not be used for sowing; and, as soon as the plants are seen to be diseased, the whole crop should be carefully looked over, and the larvæ removed, or, if not worth this trouble, the plants should be burned, to destroy the maggots. Aphides, or Green Flies, of several species, feed on Lettuces, two or three kinds of *Siphonophora* feeding on the leaves and young shoots, and species of the genus *Pemphigus* dwelling on the roots. The latter are far more hurtful than the former, as they kill the roots, and thus destroy the plants. *Pemphigus* belongs to a group of Aphides that want the two tubes so conspicuous in the others on the hinder segments of the back of the abdomen, and that have the cubital vein third from the body in the front wing not forked. The species hurtful to Lettuce are *P. fuscifrons* and *P. lactucarius*. Both live in cavities hollowed out of the soil beside the roots, and lined with fine cottony filaments secreted from the bodies of the insects. The second species is usually the more common and destructive of the two, and forms the secretion more plentifully than the other. Prevention is difficult; nor is an attack usually suspected till the drooping of the plants indicates injury to the roots. The Aphides are generally found on scraping away some earth from the surface of the roots. Soaking the ground around the plants with soapsuds, lime-water, or tobacco-water, has been suggested as a remedy; but the gain would scarcely repay the cost. Infested plants should be speedily and carefully removed, so as to destroy the Aphides on the roots; and the ground should have quicklime or gas-lime dug into it to destroy any of the pests that may remain in the soil. Attacks may, perhaps, be prevented by surface-dressings of soot, lime, or other substances disagreeable to insects. Both species live also upon the roots of various grasses and other plants; hence it is difficult to eradicate them.

Fungi. Of these, the most hurtful is the Lettuce Mildew (*Peronospora ganglioniformis*). Affected leaves show a yellowish discoloration on the upper surface, and on the lower surface there is a coat of fine white velvety threads, too small to be seen with the unaided eye. Under the microscope, the hairs are seen to be bifurcated from five to seven times, and each ultimate branch ends in a flattened dilatation, which bears four minute stalks on the corners, and one in the middle, each surmounted by an oval or nearly globular minute one-celled spore. In cold weather, in autumn, resting-spores are also produced in the tissues of the host plant. Their special use is to withstand the cold season, and to propagate the fungus when the weather becomes fit again to stimulate growth in spring. The velvety threads above described are pushed through the stomata, or little mouths of the plant. After a time, the patches of the leaf that bear the fungus begin to decay, and soon pass into a pulpy, rotten condition. The outer leaves are the first part affected, in spring, while the flowers and seeds also frequently suffer much in the autumn. The more crowded the Lettuce plants are, the more liable are they to injury from this fungus. If the plants are grown in a close, damp atmosphere, such as that in a frame for forcing them, in spring, or if weakened in any way, the Mildew does far greater mischief than where there is free access of air. Exposure of the plants to cold air has been found to materially check an outbreak of Mildew; but the only method that can be relied upon is to remove the diseased plants as quickly as possible from among the healthy ones, taking care not to leave infected stumps of old plants in the ground. It is necessary also to keep the ground clear of Groundsel, Thistles, and other weeds belonging to the order *Compositæ*, since they also are food-plants of this Mildew.

Lettuce—*continued.*

LETTUCE FLY (*Anthomyia Lactucæ*). The larva is at times very destructive to the seed of the garden Lettuce. The eggs are laid on the flower, and the yellowish-white maggots bore into the seed-vessels, eat the seed, and then go on to repeat the process. They change into chestnut-brown oval pupæ in the flower-head, or in the ground, towards the end of September or in October. The flies appear in the next spring or summer, and are about the size of house flies. The female is grey, with a chestnut stripe down the face, and blackish legs. The male is black, with the face chestnut-brown; four pale stripes on the front of the thorax; the rings of the abdomen grey, with dark base and triangular spot; legs black, and wings dark.

Prevention. Care should be taken to insure that the seed, when sown, is free from pupæ. Infected crops, when cleared off the ground, should be burned.

LETTUCE, LAMB'S. *See* **Corn Salad.**

LEUCADENDRON (from *leukos*, white, and *dendron*, a tree; the Wittebroom, or Silver-tree of the Cape colonists). ORD. *Proteaceæ*. A rather large genus (about seventy species have been described) of woolly or glabrous shrubs or trees, entirely confined to Southern Africa. Flowers greenish or yellowish, in heads at the tips of the shoots, sometimes rendered conspicuous by the large leaf-like coloured bracts which surround them. Leaves coriaceous, entire. The following is the most ornamental and best known species; several have been introduced, but very few are now in cultivation.

L. argenteum (silvery).* Silver-tree. *fl.* yellow, in terminal heads, and of but little beauty. August. *l.* closely set upon the stems, lanceolate, 4in. to 6in. long, 1in. broad, of a very beautiful silvery white. *h.* 15ft. 1693. A very handsome tree, too rarely seen in cultivation. The dried leaves are imported, and largely used in the making of wreaths, &c. (B. R. 979.)

LEUCADENDRON (of Salisbury). A synonym of **Leucospermum** (which *see*).

LEUCHTENBERGIA (named after Prince Leuchtenberg). ORD. *Cacteæ*. A monotypic genus, the species being a greenhouse succulent. Flowers produced at the top of the plant, among the younger mamillæ, very like those of *Cereus*, but having a more cylindrical perianth tube, and the stamens growing to its inside as far as the bottom of the petals, after which they converge and meet in the centre, closing up the mouth of the tube. The species, like most other succulents, require careful watering. For general culture, *see* **Mamillaria.**

L. principis (princely). *fl.* rich clear yellow, large, usually solitary, produced near the axils of the tubercles. *l.* glaucous green, succulent, 4in. or 5in. long, triangular, truncated at the apex, and there bearing six or seven long chaffy, or almost horny linear, or subulate flexuose scales, of which the centre one is almost as long as the mamillæ, and the others form a whorl round the centre. Stem about as thick as a man's arm, hard and woody, covered with the remains of decayed mamillæ. Mexico, 1847. (B. M. 4393.)

LEUCOCARPUS (from *leukos*, white, and *karpos*, a fruit; alluding to the colour of the berries). ORD. *Scrophularineæ*. A monotypic genus, the species being a tall,

Leucocarpus—*continued.*

puberulous or glabrous, greenhouse herb, very ornamental when laden with its white fruits. For culture, *see* **Mimulus.**

L. alatus (winged). *fl.*, corolla yellow, bilabiate, with an elongated tube; stamens included; filaments glabrous, yellow; peduncles axillary, opposite. September. *l.* 10in. long, 2in. broad, opposite, spreading horizontally, acutely serrulate, lanceolate, attenuated and entire towards the base, at their origin dilated and stem-clasping, much veined and reticulated. Branches decussate, widely spreading. Stem 2ft. to 2½ft. high, erect, four-sided and four-winged. Mexico. SYN. *Mimulus perfoliatus* (under which name it is figured in B. M. 3067).

LEUCOCORYNE (from *leukos*, white, and *koryne*, a club; referring to the sterile anthers). ORD. *Liliaceæ.*

FIG. 396. LEUCOCORYNE IXIOIDES.

A genus comprising three or four species of pretty half-hardy bulbous plants, natives of Chili. Flowers

FIG. 397. DETACHED FLOWERS OF TWO VARIETIES OF LEUCOCORYNE IXIOIDES, one with entire segments, the other with toothed ones.

Leucocoryne—*continued.*

white or blue, in terminal few-flowered umbels, pedicellate; perianth salver-shaped; scapes simple, leafless. Leaves radical, narrow, linear, channelled. Bulbs tunicated. For culture, *see* **Ixia.** The following are the best known species:

L. alliacea (Onion-like). *fl.*, perianth pale lilac, eight to nine lines long; segments linear-acute, longer than the tube. *l.*, many, firm, green, 6in. to 8in. long, scarcely one line broad. *h.* 6in. to 12in. Chili.

L. ixioides (Ixia-like). *fl.* white or pale blue; umbels from four to six-flowered. August. *l.* about 1ft. long. *h.* 1ft. Chili, 1826. SYN. *L. odorata.* See Figs. 396 and 397. (B. R. 1293; B. M. 2832, under name of *Brodiæa ixioides.*)

L. odorata (sweet-scented). A synonym of *L. ixioides.*

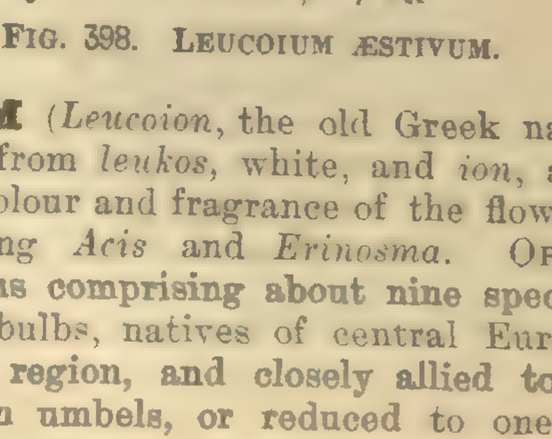

FIG. 398. LEUCOIUM ÆSTIVUM.

LEUCOIUM (*Leucoion*, the old Greek name used by Theophrastus, from *leukos*, white, and *ion*, a violet; referring to the colour and fragrance of the flowers). Snowflake. Including *Acis* and *Erinosma.* ORD. *Amaryllideæ.* **A genus comprising about nine species of ornamental** hardy bulbs, natives of central Europe and the **Mediterranean region, and closely allied to** *Galanthus.* **Flowers few, in umbels, or reduced to one, often pendulous; scape fistulous. Leaves few,** sometimes narrow, linear, sometimes plane, loriform. **There are but a few of the species in cultivation. They thrive in a free,**

Leucoium—*continued.*

open, rich soil. If very heavy, an addition of a little peat or leaf mould is recommended. Increased by offsets, which should be secured as soon as possible after the foliage ripens. Any of the species of *Leucoium* are admirably adapted for naturalising in the same way as the Snowdrop, which they resemble in general appearance, if a sufficient number of bulbs is obtainable.

L. æstivum (summer).* Summer Snowflake. *fl.* pure white, about 1in. long, the tip of each perianth segment marked with green, both inside and out; drooping; clusters from four to eight-flowered. Spring and early summer. *l.* linear, obtuse, with a blunt keel. *h.* 1½ft. Central and South Europe (South of England). An exceedingly pretty plant, and of easy culture in any ordinary garden soil. See Fig. 398. (B. M. 1210.)

L. autumnale (autumnal). This is the correct name of the plant described in this work as *Acis autumnalis*. (B. M. 960.)

L. Hernandezii (Hernandez's).* *fl.* white, about ½in. long; perianth segments oblong, obtuse, marked with a green spot; stem one to three-flowered. Summer. *l.* linear, about ¼in. broad, flat, obtuse. *h.* 1ft. to 1½ft. Majorca. This species is known in gardens as *L. pulchellum*. It is generally supposed to be a variety of *L. æstivum*, but is not so ornamental, and is, consequently, less grown. (L. B. C. 1478.)

L. pulchellum (neat). A garden name of *L. Hernandezii*.

FIG. 399. LEUCOIUM VERNUM, showing Habit and detached Flower.

L. vernum (spring).* Spring Snowflake. *fl.* white, with a green spot on the tips of the segments, solitary, drooping, fragrant. Spring. *l.* few, linear. *h.* 4in. to 6in. Central Europe, 1596. SYN. *Erinosma vernum*. A very handsome species, well suited for either rockwork or the border. See Fig. 399. (B. M. 46.) A variety named *biflorum* is sometimes seen in gardens. (B. M. 1993).

LEUCOLÆNA. A synonym of **Xanthosia** (which *see*).

LEUCOPOGON (from *leucos*, white, and *pogon*, a beard; referring to the limb of the corolla being bearded with white hairs). ORD. *Epacrideæ*. A genus comprising about 130 species of handsome greenhouse evergreen shrubs, rarely trees, of which 118 are from Australia, and the rest from New Zealand, the Pacific Islands, and the Malayan Archipelago. Flowers white, small, in terminal axillary spikes, rarely racemes. Leaves variable, sessile or petiolate, striate-nerved. All the species here described are Australian. For culture, *see* **Epacris.**

L. amplexicaulis (stem-clasping). *fl.* white; spikes slender, interrupted, terminal and in the upper axils, longer than the leaves; bracts lanceolate, leaf-like, and nearly as long as the flowers. June. *l.* sessile, stem-clasping, spreading, cordate-ovate, acute, convex or with recurved margins, ciliate, striate on both sides. *h.* 3ft. 1815. SYN. *Styphelia amplexicaulis*.

L. australis (Southern).* *fl.* pure white; spikes many-flowered, erect, axillary. Winter and early spring. *l.* linear-lanceolate, more than 1in. long, with recurved smooth margins. *h.* 2ft. to 4ft.

L. collinus (hill-loving). *fl.* white; spikes short and dense, terminal or in the uppermost axils, or terminating short, leafy, axillary branches. May. *l.* usually oblong or linear, obtuse or with a short point. *h.* 2ft. 1824.

Leucopogon—*continued.*

L. ericoides (Heath-like). *fl.* white, few together, in close axillary clusters or spikes, rarely exceeding the leaves. June. *l.* mostly oblong-linear, mucronate, but sometimes narrow and acute; margins revolute or recurved. *h.* 5ft. 1815.

L. interruptus (interrupted). *fl.* white, small, rather numerous; spikes slender and interrupted, but not exceeding the leaves, solitary, or two or three together at the ends of the branches. June. *l.* mostly crowded at the end of each year's shoot, so as to appear verticillate, from almost oval to oblong-elliptical, obtuse, or with a minute callous point, flat, or nearly so, finely nerved. *h.* 2ft. 1826.

L. juniperinus (Juniper-like). *fl.* white, almost sessile, solitary or twin. April to June. *l.* divaricate, lanceolate-linear, ending in a setaceous mucrone, with recurved, slightly denticulated margins. *h.* 3ft. to 4ft. 1804. (L. B. C. 447.)

L. lanceolatus (lanceolate). *fl.* white; spikes nodding, aggregate, axillary, many-flowered. Winter to summer. *l.* lanceolate, flat, dark green. *h.* 6ft. to 12ft. 1790. (B. M. 3162.)

L. Richei (Riche's).* *fl.* pure white; spikes erect, many-flowered, a little shorter than the leaves. Winter and spring. *l.* glabrous, oblong-lanceolate, hardly 1in. long, broadest beyond the middle, convex above, with sub-recurved margins. *h.* 3ft. to 4ft. 1822. (B. M. 3251.)

L. verticillatus (whorled).* *fl.* white or pink; spikes nearly terminal, aggregate. Summer. *l.* oblong-lanceolate, attenuated at the apex, disposed in whorls 2in. to 4in. long, of a lovely rose-colour when young. *h.* 3ft. to 6ft. 1837. (B. M. 6366.)

L. virgatus (twiggy). *fl.* white; spikes terminal and axillary, almost aggregate, few-flowered. Summer. *l.* linear lanceolate, attenuated at the apex, very acute, convexly concave, imbricated and spreading, with ciliated margins. *h.* 2ft. 1824.

LEUCOSPERMUM (from *leukos*, white, and *sperma*, a seed; in allusion to the downy seeds). SYNS. *Diastella*, *Leucadendron* (of Salisbury). ORD. *Proteaceæ*. This genus comprises about twenty-four species of greenhouse evergreen shrubs or small trees, natives of South Africa. Flowers solitary under each bract, sessile, capitate. Leaves sessile, coriaceous, often toothed at the apex, and generally covered with silky hairs. For culture, *see* **Protea.**

L. grandiflorum (large-flowered). *fl.* yellow; style longer than the very villous flower; stigma equal-sided, oblong. May to July. *l.* oblong-lanceolate, three-toothed and entire. Branches very hairy. *h.* 4ft. 1800.

L. lineare (linear-leaved). *fl.* yellow; style longer than the hairy flower; stigma gibbous on one side; involucre downy. August and September. *l.* linear, entire. *h.* 4ft. 1774.

L. medium (intermediate). *fl.* orange; drooping style nearly twice as long as the hairy flower; stigma gibbous. May and June. *l.* linear-oblong, entire, two or three-toothed. *h.* 3ft. 1794. SYN. *Protea formosa* (under which name it is figured in A. B. R. 17).

LEUCOSTEGIA. Now included under **Davallia** (which *see*).

LEUCOTHOË (the name of a sea-goddess in the Greek mythology). ORD. *Ericaceæ*. A genus containing about eight species of handsome hardy shrubs, natives of North America and Japan. Flowers white, disposed in terminal and axillary paniculate racemes. Leaves alternate, petiolate, oblong or lanceolate, serrulate, persistent or deciduous, penninerved. Leucothoës require a peaty soil, or one composed of peat and leaf mould. They are amongst the most desirable of hardy ericaceous shrubs. Propagated by seeds, which should be covered very lightly; by layers; and by divisions of established plants, in autumn or winter. Leucothoës, like many other shrubs of a similar character, do not grow very fast when young, or before being well established.

L. acuminata (acuminate). *fl.* white, borne in great profusion; corolla cylindrically ovate, pedicellate, drooping; racemes axillary, very short, corymbose, nearly naked. June. *l.* ovate-lanceolate, gradually narrowed to the top, acuminated, quite entire or unequally serrated, glabrous, shining, reticulately veined, leathery. *h.* 2ft. to 3ft. North America, 1765. SYN. *Andromeda acuminata* (under which name it is figured in S. E. B. 89).

L. axillaris (axil-flowering).* *fl.* white; corolla ovate-cylindrical; racemes axillary, spicate, sessile, beset with scaly bracts. May. *l.* oblong or oval, acuminated, covered with scattered glandular

Leucothoë—*continued.*

hairs on the under surface. Young branches clothed with powdery down. *h.* 2ft. to 3ft. North America, 1765.

L. Catesbæi (Catesby's). *fl.* white, exhaling the unpleasant odour of Chestnut blossoms; sepals ovate-oblong, not overlapping in the flower. May. *l.* ovate-lanceolate to lanceolate, and tapering into a long and slender acumination, serrulate throughout, conspicuously petioled. *h.* 2ft. to 4ft. North America. SYNS. *Andromeda Catesbæi* (B. M. 1955) and *A. axillaris* (B. M. 2357).

L. Davisiæ (Mrs. Davis').* *fl.* white, recurved, pendulous; racemes nearly sessile, many-flowered, erect, forming close terminal panicles. *l.* oblong, obtuse at both ends, obscurely serrulate, bright green. *h.* 3ft. to 5ft. California, 1853. (B. M. 6247.)

L. racemosa (racemose).* *fl.* white; racemes or spikes mostly solitary, erect or ascending; sepals lanceolate-ovate, very acute. May and June. *l.* oblong or oval-lanceolate, acute, serrulate, somewhat pubescent when young, and on the midrib beneath. *h.* 4ft. to 10ft. North America. (W. D. B. 36, under name of *Andromeda spicata.*)

L. recurva (recurved). *fl.* white; racemes spreading or recurved; sepals ovate. June. *l.* more acuminate than in *L. racemosa*. North America. This species is dwarfer and more straggling than *L. racemosa*. SYN. *Andromeda recurva.*

LEUZEA (named in honour of De Leuze, a friend of De Candolle). SYN. *Rhacoma.* ORD. *Compositæ.* A genus comprising three species of hardy herbaceous perennials, one broadly dispersed through the western region of the Mediterranean, another from Portugal, and the third from Spain. Flower-heads purplish, large; involucre ovoid or sub-globose, shining; receptacle densely sub-paleaceous, setose. Leaves alternate or radical, dentate or pinnatifid, hoary-tomentose underneath. Only one species—*L. conifera*—is in cultivation. This is a pretty, rather strong-growing, interesting plant. It requires an ordinary garden soil, and may be increased by seeds, or by divisions of the plants, in spring.

L. conifera (cone-bearing). *fl.-heads* purple; involucre scaly, glabrous. July. *l.* lanceolate. Stem simple, one-headed. *h.* 9in. South Europe, 1683.

LEVELLING. A scientific knowledge of Levelling, sufficiently exact for land surveying, is rarely expected of a gardener; but, in the execution of ordinary ground work, an acquaintance with the principles, and the method of applying them according to requirements, will be of the utmost importance. Levelling is a term similarly applied to the equalising of soil, either on a horizontal or an inclined plane surface. When the preparation of land, by digging, for the reception of seeds or crops, is the only object in view, the surface will generally be rendered level enough with the spade or rake, if their use is guided under the eye of a practical workman. In the formation of an edging of any description, the making or gravelling of walks, turf-laying on lawns, draining operations, &c., some method, in accordance with scientific teaching, must be adopted, if satisfactory results would be attained. The difference in permanent work, as above named, executed on a definite plan, regarding the Levelling or the natural inclination of the soil, and that performed in a haphazard way, is widely marked, even on its completion, and more so when tested, afterwards, by heavy rains. Where the general surface of garden land is flat, or nearly so, Levelling is of greater importance, in order to dispose of any superfluous rain or other water which may collect. A slight incline will cause water to flow, but an obstruction to the same extent will similarly check its course; and, as inequalities of this sort cannot with certainty be avoided where the uses of levels are ignored, their value in securing a uniform surface on any plane will be readily seen. Reference may first be made to the theodolite, a rather expensive instrument, principally used in land surveying, for measuring the horizontal or the vertical angle between two distant objects. It consists of a small telescope, which may be raised or lowered according as the disposition of the ground may require, the angle in either direction being ascertained by two graduated circles, which are attached. The instrument is provided with a spirit-level and adjusting screws, for fixing its proper position. On ascertaining the apparent level at the opposite end, through the telescope, the amount of rise or fall in the distance will be indicated, and a calculation will show how much it is in a given distance. Far less expensive, and, moreover, invaluable instruments for Levelling purposes generally, are a good spirit-level, an ordinary straight-edge, and three borning-rods. The spirit-level, in its simple form, consists of a glass cylinder tube, filled with spirit, except a very small space, which is occupied by a bubble of air. The tube is sometimes fixed in the centre of a straight-edge; but this plan is not to be recommended, on account of the liability of the latter to become crooked. A more certain method is that of fixing it exactly in the middle of a piece of hard wood, having a plane surface on all sides. The air-bubble, being lighter than spirit, will rise in the tube, whenever either end is placed above the horizontal line. A straight-edge should be made of a strip of wood, not liable to warp easily, and its edges should be planed straight and even as frequently as they get the least otherwise. Borning-rods are about 4ft. long, and have a strip of wood placed exactly at right angles across their tops, and painted respectively red, white, and either black or blue, in order to distinguish each readily from the other. When made of an equal length, and placed in line, all the tops must run evenly when viewed from either end. Sometimes one rod is made longer than the others, and a very small hole is bored through the strip at the exact height of the others, so that the eye may not be misguided. By sufficient practice, Levelling may be very exactly carried out with the borning-rods, after the spirit-level and straight-edge have aided in fixing the proper position for the pegs at the two ends. An insertion of ordinary wooden pegs, at distances of about 8ft. apart, will be a sufficient guide for forming a dead level surface, or for equalising a fall throughout a given length. There are other forms of levels, but those referred to will be found sufficient for all gardening purposes.

LEVISTICUM (a corruption of *Ligustikon*, the name given by Dioscorides to another Umbellifer). ORD. *Umbelliferæ.* A monotypic genus. *L. officinale* is a hardy herbaceous perennial, with yellow flowers, and ternately-decompound leaves, having deeply-toothed

FIG. 400. LEWISIA REDIVIVA.

Levisticum—*continued.*

obovate-cuneate leaflets. It is of no horticultural value, and is rarely seen out of botanic gardens. A form having variegated leaves is offered by Continental seedsmen.

LEWISIA (named after Captain M. Lewis, 1774-1809, who accompanied Captain Clarke to the Rocky Mountains of North America). ORD. *Portulaceæ*. A monotypic genus, the species being a very curious and handsome hardy herbaceous perennial, well adapted for growing on rockwork, in crevices where the roots can obtain plenty of moisture without stagnancy. It flourishes best in a sunny spot; indeed, this is the only situation in which it will produce flowers. During hot summers, Lewisias should have a daily watering. Propagated by seeds; or by divisions of the roots, in spring.

L. rediviva (revived). *fl.* pink, with a nearly white centre, from 3in. to 4in. across; calyx finely veined with red; scapes one-flowered. Summer. *l.* in rosettes, linear, bluntish, succulent, withering on the appearance of the flowers. Roots edible, tapering, fleshy. *h.* 3in. to 4in. North-Western America, 1826. See Fig. 400. (B. M. 5395.)

LEYCESTERIA (named after William Leycester, once Chief Judge of the principal native court under the Bengal Presidency). ORD. *Caprifoliaceæ*. A monotypic genus, the species being a very handsome hardy, or nearly hardy, deciduous shrub, with a rambling habit and elongated fistular branches, which rise from scaly buds. It is a distinct and interesting plant, well deserving of a much more extended cultivation than it now enjoys. *L. formosa* thrives in any moderately good garden soil, and is propagated by cuttings of the short young shoots, made in spring; by older ones, made in autumn, and placed under a handlight; or by seeds, sown in spring.

FIG. 401. FLOWERING BRANCH OF LEYCESTERIA FORMOSA.

L. formosa (handsome).* *fl.* white, with a tinge of purple, middle-sized, sessile, in fascicles, disposed in approximate whorls of fives and sixes, the whole forming short leafy drooping racemes, which terminate the branches and branchlets; corolla funnel-shaped, having the tube gibbous above the base, and the limb campanulate and divided into five ovate nearly equal lobes; bracts large, leafy, purplish, pubescent, generally six under each whorl of flowers. Summer. *l.* opposite, ovate-lanceolate, acuminated, petiolate, smooth, entire. *h.* 4ft. to 6ft. Temperate Himalayas, 1824. Pheasants are said to be fond of the fruit of this species, which is recommended as a good covert plant. See Fig. 401. (B. M. 3699.)

LEYSSERA (named after T. W. Leysser, 1731-1815, a German botanist). Including *Longchampia*. SYNS. *Asteropterus*, *Callicornia*. ORD. *Compositæ*. A genus comprising four species of greenhouse evergreen herbs or sub-shrubs, three of which inhabit South Africa, and the other extends from Southern Spain,

Leyssera—*continued.*

through North Africa, as far as Western Asia. Flower-heads yellow, on long peduncles; involucre turbinate or campanulate. Leaves narrow, linear, or subulate, entire. Leysseras thrive in a compost of rough peat and loam. Propagated by half-ripened cuttings, inserted in sandy soil, during summer; or by seed.

L. capillifolia (hair-leaved). *fl.-heads* yellow; peduncles naked, axillary, one-headed. June. *l.* woolly, subulate, filiform. Stem filiform, branched. *h.* 6in. Barbary, 1822.

L. gnaphalioides (Gnaphalium-like). *fl.-heads* orange; scales of involucre lanceolate. July to September. *l.* linear, subulate, ciliate, rough. *h.* 2ft. Cape of Good Hope, 1774.

L. squarrosa (squarrose). A synonym of *Helipterum gnaphalioides*.

LHOTZKYA (named after Dr. John Lhotzky, a Viennese botanist, who travelled in Australia). ORD. *Myrtaceæ*. A genus comprising eight species of greenhouse evergreen Heath-like shrubs, limited to Australia. Flowers sessile or shortly pedicellate, solitary in each axil along the branches, or forming terminal leafy heads. Leaves scattered or rarely opposite, semi-terete, or three or four-angled, rigid, entire, glabrous or pubescent. *G. acutifolia* and *G. violacea*, the species best known to cultivation, thrive in a compost of loam, with the addition of a little peat and sand. Propagation is effected by cuttings, made from the young shoots when the base is a little firm, and inserted in sand, under a glass.

L. acutifolia (acute-leaved). *fl.* white or yellowish, nearly sessile along the branches. June. *l.* scattered, crowded, linear, mucronate, mostly about ½in. long, prominently keeled beneath. *h.* 1½ft. 1843. Plant erect, pubescent.

L. violacea (purple). *fl.* purplish, in the upper axils, forming dense terminal heads. June. *l.* alternate or scattered, oblong, very obtuse, about ¼in. long, concave above, convex beneath. *h.* 1½ft. 1843. Plant hairy, erect, bushy.

LIABUM (probably a meaningless name, as is frequent with those given by Adanson). Including *Paranephelius* and *Sinclairia*. SYNS. *Andromachia* and *Starkea*. ORD. *Compositæ*. A genus comprising about forty species of herbs or shrubs, natives of tropical and subtropical America, and the Andes. Flower-heads yellow, radiating; involucre campanulate or hemispherical; achenes villous or rarely glabrous. Leaves opposite, entire, dentate or lobed. *L. uniflorum*, probably the only species yet in cultivation, is a half-hardy alpine. It requires a compost of sandy loam and leaf mould, to which a little peat may be added. Propagated by divisions, in spring.

L. uniflorum (one flowered). *fl.-heads* brilliant golden yellow, from 2in. to 3in. across. *l.* obovate, rugose, sub-pinnatifidly lobed. Peruvian Andes, 1870. (B. M. 5826, under name of *Paranephelius uniflorus*.)

LIATRIS (derivation unexplained). Blazing Star; Button Snake-Root. ORD. *Compositæ*. A genus comprising about sixteen species of hardy perennial herbs, natives of North America. Flower-heads purplish or white, handsome, spicate, racemose, or panicled; scales of the involucre imbricated, appressed; receptacles naked; achenes slender. Leaves alternate or scattered, narrow, entire, one to five-nerved. The species form exceedingly pretty border plants, thriving in any moderately good light soil. Propagated by divisions, in spring; or by seeds, sown usually early in autumn.

L. elegans (elegant). *fl.-heads* purplish, disposed in spikes 1ft. or more in length. Summer and autumn. *l.* spotted, glabrous; radical ones spathulate, three to five nerved; upper ones ligulate, short, sometimes spiny tipped. *h.* 2ft. to 4ft. 1787. (B. R. 267.)

L. graminifolia (grass-leaved). *fl. heads* purple, in the axils of the upper leaves or bracts, loosely spicate; involucre about six-flowered. September. *l.* remotely dotted, acuminated, ciliate at base. Stem simple. Root tuberous. *h.* 2ft. 1838.

L. g. dubia (doubtful). A variety with an upright and virgate spike, with many approximate, rather large heads, or occasionally racemiform, bracts of the involucre narrower and thinner than in the type. (B. M. 3828, under name of *L. propinqua*.)

Liatris—*continued.*

L. g. pilosa (pilose). A variety having unusually narrow involucral scales. (B. R. 595.)

L. odoratissima. *See* **Trilisa odoratissima.**

FIG. 402. LIATRIS SPICATA, showing Habit and detached Flower-head.

L. pycnostachya (dense-spiked). *fl.-heads* pale purple, in a dense cylindrical spike, 1ft. to 1½ft. long. Summer and autumn. *l.* rigid, sessile; lower ones narrow, lanceolate, blunt, five to seven-nerved; upper ones short, crowded, narrow-ligulate, acuminated. Stems thick, leafy. *h.* 3ft. to 5ft. 1732. A very desirable plant, and one of the most useful for growing on dry soils where few other things will live. It is best treated as a biennial, by sowing the seeds in spring.

L. scariosa (scarious). *fl.-heads* purple, almost 2in. in diameter, disposed in an elongated corymb. September. *l.* very long and narrow. *h.* 2ft. 1739. (B. M. 1709; B. R. 1654.)

L. spicata (spiked). *fl.-heads* purple, sessile, in spikes from 6in. to 15in. long; involucral scales oblong or oval, appressed. September. *l.* lanceolate, ciliated at base, acute. *h.* 1ft. to 2ft. 1732. See Fig. 402. (B. M. 1411.)

L. squarrosa (squarrose). *fl.-heads* bright purple, rough, shortly stalked, on leafy and downy stems; involucral scales, with elongated and leaflike tips. Summer and autumn. *l.*, radical ones long, about ½in. wide, three to five-nerved; stem ones ligulate, rigid. *h.* 2ft. to 3ft. 1732.

LIBER. "The innermost and youngest circle next the young wood is the Liber, or inner bark, formed of long, tough, woody tissue, called bast-cells" (Bentham).

LIBERTIA (named after Marie A. Libert, a Belgian lady, who wrote on botanical subjects). SYNS. *Nematostigma, Renealmia.* ORD. *Irideæ.* A genus comprising eight species of very ornamental hardy, or nearly hardy perennial herbs, inhabiting Chili, Australia, and New Zealand. Perianth white or blue; inflorescence loosely corymbose-paniculate; spathes few-flowered. Leaves, radical ones distichous, narrow-linear, firm, densely crowded; stem ones terete. The majority of the species will prove tolerably hardy if provided with a slight protection in winter. All thrive on warm borders of light soil. Propagated by seeds, sown as described for **Iris** (which *see*); or by careful divisions, in spring.

L. formosa (handsome). *fl.* white, capitate; perianth six-parted, rotate, glabrous; tube none; pedicels light green; outer spathe bivalvular, repeated on the inner flowers, which expand in succession. May. *l.*, root ones 6in. to 12in. long, ½in. to ¾in. broad, linear-sword-shaped, acute; stem ones few, sheathing, uppermost about 1½in. long. Stem 16in. high, simple. Chili, 1831. See Fig. 403. (B. M. 3294.)

Libertia—*continued.*

FIG. 403. LIBERTIA FORMOSA, showing Habit and Portion of detached Inflorescence.

L. grandiflora (large-flowered). *fl.* pure white, disposed in spike-like panicles about 3ft. high. Summer. *l.* narrow, stout, about 2ft. long, and nearly ½in. broad. New Zealand, 1870.

L. ixioides (Ixia-like). *fl.* white, with pale yellow stamens, numerously disposed in closely-packed panicles. Summer. *l.* linear, rigid, from 1½ft. to 2ft. long, tufted. *h.* 2ft. to 4ft. New Zealand, 1865. Hardy.

FIG. 404. FRUITING BRANCH AND WINGED SEED OF LIBOCEDRUS CHILENSIS.

Libertia—*continued.*

L. paniculata (panicled). *fl.*, clusters umbel-like; perianth segments ovate, spreading; panicle oblong, loose, and irregular, often occupying half the stem. April. *l.* almost radical, grass-like, flaccid, 9in. to 18in. long, and mostly about ¼in. broad. Stem 1ft. to 2ft. high, with sometimes a short leaf below the inflorescence. Australia, 1823. (B. M. 6263.)

L. pulchella (pretty). *fl.*, perianth segments narrower than in *L. paniculata*, and more nearly equal; rachis of the cluster often somewhat elongated, and sometimes a pedunculate cluster from the axil of the same bract; scape or peduncle from under 6in. to nearly 12in. long. April. *l.* rarely 6in. long, and two to three lines broad, often not above half that size. *h.* 1ft. Australia, 1823.

LIBOCEDRUS (from *libanos*, incense, and *Cedrus*, the Cedar; referring to the fragrant wood). Incense Cedar. ORD. *Coniferæ*. A genus comprising eight species of handsome hardy or half-hardy evergreen trees, with the habit of *Thuya* (under which the present genus was formerly included). Two are natives of Chili, two of New Zealand, and one each of New Caledonia, Japan, China, and California. Flowers monœcious, or male and female on same plant, but separate and terminal; male catkins almost cylindrical; female ones solitary and globular. Leaves scale-formed, compressed in opposite pairs, and in four imbricated rows, the under and upper ones much the smallest. Cones oval, more or less obtuse, woody, composed of from four to six scales, which are flat, or slightly concave on the inner face. For culture, *see* **Thuya.**

L. chilensis (Chilian). *l.* glaucous-green, oblong-trigonous, appressed, obtuse. Branches compressed, spreading, pendulous, but somewhat ascending towards the summit, and quite erect at the top. *cones* ½in. long, drooping, on short footstalks. *h.* 60ft. to 80ft. Chili. This handsome, densely-branched, conical tree is not hardy except in favourable situations, and only attains a shrub-like aspect. The wood possesses an aromatic fragrance, and is very hard and yellowish. SYN. *Thuya chilensis.* See Fig. 404. (L. & P. F. G. i. 47.) A variety known as *viridis* is a handsome form of the type, having bright green foliage, and branchlets entirely devoid of glaucous bands.

L. decurrens (decurrent).* *l.* bright rich glossy green, small, linear, scale-like, quadrifariously imbricated, acute at the free apex, with long decurrent base, elongated on the older branches. Branchlets numerous, alternate, and plaited or flattened laterally. *cones* erect, solitary, on the ends of the upper branchlets, 1in. or more long, ½in. wide, olive-brown. *h.* (in its native habitat) 40ft. to 140ft. Sierra Nevada Mountains of California. A handsome, distinct, erect, compact-growing tree, with a stout trunk, distinguished by its glandless decurrent leaves and columnar habit. SYN. *Thuya gigantea*, of gardens. (W. & F. 1884, 191.)

FIG. 405. FRUITING BRANCHLET OF LIBOCEDRUS DONIANA.

Libocedrus—*continued.*

L. Doniana (Don's). *l.* very like those of *L. chilensis*, but more closely set on the branchlets, and without any silvery line on the under surface. Branches spreading, tortuous, with flattened fern-like branchlets. *h.* 30ft. to 70ft. New Zealand, 1847. A very beautiful species where it can thrive well, but it is exceedingly tender in our climate. SYN. *Thuya Doniana.* See Fig. 405.

L. tetragona (four-sided). *l.* small, ovate, scale-like, obtuse, pale green, imbricated in four rows. Branches spreading, depressed; branchlets tetragonal. *cones* consisting of six coriaceous scales, in three pairs. *h.* 40ft. to 80ft. Patagonia, 1849. A handsome, compact, pyramidal shrub or tree, more hardy than the others generally. It is, however, rarely seen in our gardens. SYN. *Thuya tetragona.* (G. C. 1850, 439.)

LIBONIA (named after M. Libon, a traveller in Brazil). ORD. *Acanthaceæ.* This genus is now included, by Bentham and Hooker, under *Jacobinia;* but, as the plants are well known by the former name, their culture, &c., are here given. Libonias, when well grown, are very ornamental and free-flowering plants for greenhouse decoration. They are readily propagated by cuttings, inserted in any close frame during spring and early summer. *L. floribunda* is a species largely grown for winter flowering—a purpose for which it proves a very useful subject. Old plants, from which it is intended to propagate, should be placed in a little heat, early in spring, to start new growth, and the cuttings should then be inserted in sandy soil, and kept close until rooted. They may be potted off singly afterwards, and grown, throughout the summer, in a frame, where plenty of air may be admitted, to induce a sturdy and short-jointed growth. Turfy loam, with about its bulk of leaf soil, or well-decayed manure, added, is a suitable compost; and 5in. or 6in. pots are generally large enough for the plants to flower in. A light shading may be applied in hot weather; but full sun must be admitted in early autumn, to thoroughly ripen the wood for flowering. Some persons prefer planting out in frames, early in June, in prepared soil, and lifting again in autumn. If kept close for a few days, after being potted up, the plants soon become re-established, and the plan answers well. Old plants may be cut back after flowering, and grown, under similar routine treatment, several years in succession. It is advisable to raise a few young ones annually, for replacing any that become leggy. Libonias require an intermediate temperature when flowering; they must also be kept well watered, or the result will be a loss of nearly all the leaves. Red spider frequently attacks them, and, when once allowed a footing, is only with difficulty eradicated. Frequent syringing throughout the summer will generally prove an effectual preventive against much injury being caused.

L. floribunda (bundle-flowered).* *fl.* scarlet, yellow tipped, tubular, drooping, very abundant; calyx five-cleft; corolla funnel-tubular; limb erect, bilabiate. *l.* elliptic-oblong. Brazil, 1862. A very ornamental plant. (B. H. 1863, 2.)

L. Penrhosiensis (Penrhose).* A very elegant plant, obtained by crossing *L. floribunda* with *Jacobinia* (*Sericographis*) *Ghiesbreghtiana*. It has much brighter and deeper-coloured flowers than its parent, and the leaves are more acute. It is an exceedingly useful decorative plant, freely producing its fine showy flowers, which are of a bright rich crimson, passing into fiery red, in the depth of winter. (R. H. 1876, 50.)

LICHENS. These are thalloid plants, which live attached to stones, or the bark of trees, or on the ground. Their growth is extremely slow, and their period of existence considerable. They consist of two structural elements: (1) Filaments, or hyphæ; (2) green cells, or gonidia (which may be solitary, in groups, or in chains). These elements may be arranged in layers, or irregularly intermixed. In form, Lichens present the following modifications, viz.: (1) Crustaceous, in which the whole under surface is firmly adherent to the body upon which it grows; (2) Foliaceous are attached by many small processes from the under side, called rhizines; (3) Fruticose generally

Lichens—*continued.*

consist of slender branches, and are attached by one point only; (4) Gelatinous, so called from the nature of their substance when moist. Lichens are reproduced by spores, borne, generally, eight together, in club-shaped filaments (asci), which are found in large numbers, together with hairs (paraphyses), in external receptacles. In addition to these, other receptacles are formed, called spermagonia, which contain filaments (sterigmata), bearing short rod-like bodies (spermatia). Similar cavities bear larger spore-like bodies, called pyenidia, whose precise nature, as well as that of the spermatia, is not known. A second method of reproduction is by soredia, which consists of one or more gonidia, surrounded by hyphæ. The whole, or only a part, of the Lichen thallus can thus be converted into a powdery mass. The exact relation of the hyphæ to the gonidia is still disputed. Some writers assert that the gonidia are produced by the hyphæ; others (of whom Schwendener was the leader) say that the gonidia are Algæ, upon which fungi (the hyphæ) are growing parasitically. This differs from parasitism in general, inasmuch as the host is not destroyed, but seems to profit by the union. Many Lichens furnish excellent dyes, *e.g.*, *Roccella tinctoria*, from which litmus is obtained. *Cladonia rangiferina* supplies the reindeer with food. Lichens are, in some cases, useful as food or medicine—*e.g.*, Iceland Moss (*Catraria islandica*), —but their principal value consists in their properties as dyes. *Lecanora esculenta* is frequently met with in immense quantities in the most arid, desert regions of Asia and North Africa; it occurs in rounded masses about the size of a filbert, and is largely used as food. It possesses, too, a peculiar interest, on account of its being supposed, by some commentators, to be the "manna" which fed the children of Israel during their wanderings in the wilderness.

"Lichens are not parasitic; but when they clothe trees they impede the circulation of air, and hasten decay. They further intercept light when enveloping young shoots, and interfere with the development of cambium and the evolution of the foliage" (Hooker).

LICHTENSTEINIA. A synonym of **Ornithoglossum** (which *see*).

LICUALA (from its native name in the Moluccas). SYN. *Pericycla*. ORD. *Palmeæ*. A genus comprising about thirty species of dwarf stove palms, natives of Eastern tropical Asia the Malayan Archipelago, New Guinea, and Northern Australia. Flower-spikes branching, with numerous incomplete spathes. Leaves terminal, fan-shaped, with prickly stalks, the prickles being conical, or often hooked. The species thrive in a compost of two parts peat and one of sandy loam. A strong, moist heat is most essential to success. Propagated by seeds, sown in a sandy soil, and placed in a strong, moist, bottom heat.

L. acutifida (sharply-divided). This species yields the walking-sticks known by the name of Penang Lawyers. It is a native of Pulo Penang, where it grows to a height of about 5ft., its stems being about 1in. in diameter, except at the base, where they are considerably thicker.

L. elegans (elegant).* *l.* fan-shaped, split down to the petiole; segments plaited, praemorse at the ends, about 1½ft. long, light shining green; petiole 2ft. to 3ft. long. Sumatra.

L. grandis (great).* *fl.* ½in. long; spadices several, rising from among the leaves, and nearly as long as they are; spathes at base of panicles, two or more, 2in. to 3in. long, lanceolate, acute, brown, striated. February. *l.* about twenty in the crown, deep bright green, petiole 2½ft. to 3ft. long, slender, spiny; blade 3ft. in diameter, about 2ft. long, orbicular or semi-orbicular, concave, closely plaited, and a little wavy, margins cleft into bifid lobes, about 1in. long; lobules of the lobes very obtuse. Trunk 3½ft. to base of leaves, 10in. in circumference. *h.* 6ft. New Britain. (B. M. 6704.)

L. horrida (horrid). *l.* dark green, fan-shaped, large, plaited; petioles stout, armed at the edges with very stout, formidable spines. Indian Archipelago. A handsome species, resembling *L. elegans*.

L. peltata (peltate). *fl.* obovate. *l.* digitately fan-shaped, peltate, leaflets long, cuneated, many-nerved, middle one broadest, sharply bifid and toothed; petioles prickly on margins. *h.* 15ft. India.

Licuala—*continued.*

L. Rumphii (Rumph's). *l.* palmate; segments linear, toothed, truncate at end. Stem spiny. *h.* 6ft. Moluccas, Borneo, 1802. SYN. *L. spinosa*.

L. spinosa (spiny). A synonym of *L. Rumphii*.

LIEBIGIA. Now included under *Chirita*.

LIETZIA (named after A. Lietze, a nurseryman at Rio Janeiro). ORD. *Gesneraceæ*. A remarkable and handsome stove tuberous-rooted plant. Corolla tubular, campanulate, widely gaping; upper lip erect, lower one somewhat uneven and obscurely lobed. The species requires a well-drained compost of light fibrous loam, leaf mould, and sand. Propagated by seeds, sown in early spring, in heat; by cuttings, inserted in sand, under a glass, in bottom heat; or by tubers, which must be kept dry in winter, and potted in March.

FIG. 406. LIETZIA BRASILIENSIS, showing Habit, and detached Leaf (reduced), Flower, and Capsule, with its persistent Calyx (natural size).

L. brasiliensis (Brazilian). *fl.* green, richly mottled with brown; stamens much exserted; racemes terminal, many-flowered. *l.* hairy, lanceolate, tapering to both ends, opposite, serrated. *h.* 1ft. to 1½ft. Brazil, 1880. See Fig. 406. (R. G. 1005.)

LIEVENA. A synonym of **Quesnelia** (which *see*).

LIGATURES. In nearly all the methods of budding and grafting, a Ligature, or bandage, is necessary for keeping the bud or scion firmly on the stock, and preserving the separated tissues from the action of the atmosphere, which otherwise would soon have an injurious effect. The sort of Ligature, and its strength, depend a good deal on what it has to bind. When stocks are large, and possibly grafted on a system requiring splitting, the Ligature must be strong, and bound tightly; but when the bark only is raised, a pressure sufficient to keep the parts slightly compressed will be enough. Various substances are used for Ligatures, the best being those which expand and contract least under the influence of changeable weather, and also allow of an expansion in the stock without cutting or injuring it. Woollen thread answers well on small stocks, either for budding or grafting. A good Ligature for bandaging large stocks is lime-tree bark, as prepared for manufacturing ropes. It should be dipped in water, and then divided out; but no material of this description should be twisted before being used. Ordinary Russian mats are very serviceable, as the softer parts of them answer the purpose equally as well for many plants as a more expensive material. A Ligature should be carefully applied with both hands, so soon as possible after the graft or bud is inserted. It should be

Ligatures—*continued.*

rolled spirally round the cut surfaces, and drawn tight enough, at every turn, to keep all the parts firmly in position. Whatever the material used as a Ligature may be, it should be examined occasionally after being applied, and gradually loosened and removed when a complete union of the parts is effected.

LIGERIA SPECIOSA. *See* **Sinningia speciosa.**

LIGHT. The exposure of plants to Light is one of the chief conditions under which they succeed in making their growth. Growth made in the absence of sufficient solar Light consists of weak, elongated shoots that are unable to perform their proper functions. All vegetable life is in an active state throughout the spring and summer, when the amount of heat and Light is correspondingly great; as both diminish in autumn, growth declines, and many plants remain in a somewhat dormant state until the following year. The amount of Light available in winter needs utilising to the fullest extent for plant cultivation, by keeping the glass in all houses and pits frequently cleaned. Heavy blinds permanently fixed on houses, in summer, often prove injurious, by preventing an amount of Light from entering in cloudy weather that would be most beneficial to the occupants. Plants standing in a dark part of a house will be found to grow weak and drawn, compared with others in the same structure similarly situated except in regard to this important element. Light is most essential to all vegetation, on account of the chemical action it causes in the production of colouring matter in the leaves. It is purposely excluded from many vegetables, by closing their outside leaves together or covering the stems with soil, as the case may be, in order to blanch and render the centre or edible portion tender and available for use.

LIGHTFOOTIA (named in honour of Rev. J. Lightfoot, 1735-1788, author of a Flora of Scotland). ORD. *Campanulaceæ.* A genus of about forty species of greenhouse evergreen small shrubs, or erect annual or branching perennial herbs, natives, for the most part, of the Cape of Good Hope. Flowers blue, white, or rose, small. Leaves alternate, rarely opposite, often fasciculate in the axils, small or narrow, often squarrose, entire or rigidly dentate. Lightfootias thrive in a mixture of loam, peat, and sand. Propagated by cuttings, made of young shoots, and inserted in sand, containing a little peat, under a bell glass; the annuals, by seed, sown in a warm frame, in spring. Probably the species here described are the only ones yet introduced.

L. ciliata (ciliated).* *fl.* bluish, axillary and terminal, in loose racemes at the tops of the branches. July. *l.* alternate, somewhat reflexed, ovate-lanceolate, acute, entire. Stem decumbent, woody at the base, branched. Branches woody, erect, purplish. *h.* 9in. Cape of Good Hope, 1822. SYN. *L. Loddigesii.* (L. B. C. 1038, under name of *L. tenella.*)

L. Loddigesii (Loddiges'). A synonym of *L. ciliata.*

L. oxycoccoides (Oxycoccus-like). *fl.* white, with reddish nerves, axillary and terminal, at the tops of the branches. July. *l.* alternate, reflexed, ovate-lanceolate, acute, thin, denticulated at the base. Stem erect or ascending, much-branched; branches diffuse. *h.* 6in. to 12in. Cape of Good Hope, 1787.

L. sessiliflora (sessile-flowered). *fl.* blue, numerous, terminal and axillary, solitary, racemose. *l.* alternate, rarely opposite, numerous, very narrow, erectish or spreading. Stem ascending or erect, rather woody, mostly simple or branched. *h.* 1ft. to 1½ft. Cape of Good Hope.

L. tenella (delicate). A synonym of *L. ciliata.*

LIGNUM VITÆ. *See* **Guaiacum officinale.**

LIGULARIA (from *ligula*, a strap; referring to the florets). ORD. *Compositæ.* A genus comprising about a score species of hardy herbaceous perennials, with handsome leaves, now included, by Bentham and Hooker, under *Senecio.* Ligularias require generally a free, moist soil, and prefer a rather peaty one. Propagated by divisions, in spring and autumn. Only the undermentioned species are worth growing.

L. japonica (Japanese). *fl.-heads* yellow, small, paniculate. Autumn. *l.* stalked, glabrous, green above, paler beneath; lower ones inciso-palmate, lobes unequally dentate; upper ones undivided, serrate. Japan. SYN. *Erythochæte palmatifida.*

Ligularia—*continued.*

L. Kæmpferi aureo-maculata (Kæmpfer's gold-spotted).* *l.* large, orbicular-cordate, dark green, glabrous, shining, irregularly blotched with yellow, or sometimes with white and rose. Stems thick, fleshy. *h.* 1ft. to 2ft. Japan. SYNS. *Farfugium grande* and *Senecio Kæmpferi aureo-maculata.* (B. M. 5302.)

FIG. 407. LIGULARIA MACROPHYLLA, showing Habit and detached Flower-head.

L. macrophylla (large-leaved). *fl.-heads* yellow, borne in a dense, long, terminal spike. *l.* oval, very large, glaucous. *h.* 3½ft. Caucasus. A very large and vigorous-growing perennial, and an excellent plant for sub-tropical gardening. See Fig. 407.

LIGULATE. Strap-like; having the form of a strap.

LIGUSTICUM (named from the country Liguria, where the officinal Lovage, *L. Levisticum*, abounds). ORD. *Umbelliferæ.* A genus comprising about a score species of glabrous perennial herbs, dispersed over the Northern hemisphere. Flowers in compound umbels, often many-rayed; petals white, or rarely yellowish-white. Fruit ovate or oblong. Leaves pinnately or ternato-pinnately decompound. *L. scoticum* is sometimes employed as a potherb. It will grow in any ordinary soil, but is of no horticultural value.

L. scoticum (Scotch). Lovage. *fl.*, umbels of twelve to twenty rays, with a general involucre of two or three narrow bracts and more numerous ones to the partial umbels. Summer. *l.*, lower ones on long stalks, deeply divided into three, each branch bearing three segments or one deeply three-lobed segment. Stem 1ft. to 2ft. high. Britain, &c.

LIGUSTRINA AMURENSIS. *See* **Syringa amurensis.**

LIGUSTRUM (the old Latin name used by Pliny, probably from *ligare*, to tie; referring to the use made of the flexible shoots). Privet. SYN. *Visiania.* ORD. *Oleaceæ.* A genus comprising about twenty-five species of ornamental, hardy, evergreen or deciduous, glabrous shrubs or small trees, natives of Europe, temperate and tropical Asia, and Australia. Flowers often white, disposed in trichotomous or thyrsoid terminal panicles. Berry scarcely drupaceous. Leaves opposite, entire. The species and varieties are of easy culture in almost any soil and situation, such as the neighbourhood of large towns, where a smoky atmosphere prevails, in the shade, or under the drip of trees. The common Privet grows best in a moist and strong loamy soil, and attains the largest size in an open situation. Propagated by cuttings of the young shoots, or by seeds, in the same manner as advised for the Hawthorn (*see* **Cratægus**). The former method of propagation should be employed with varieties.

L. amurense (Amur). A synonym of *L. Ibota.*

L. angustifolium (narrow-leaved). A garden synonym of *L. Massalongianum.*

Ligustrum—*continued.*

L. californicum robustum variegatum (Californian, robust, variegated). A synonym of *L. ovalifolium variegatum.*

L. compactum (compact). *fl.* white, in compound pyramidal panicles. Summer. *l.* elliptic-lanceolate, glabrous. Himalayas, 1874. SYNS. *L. lancifolium*, *L. longifolium*, and *L. Simonii.*

L. glabrum (glabrous). A synonym of *L. japonicum.*

L. Ibota (Ibota).* *fl.* white, salver-shaped; inflorescence spiciform. Summer. Berry round, shining, black. *l.* ovate or elliptic, obtuse, rarely lanceolate; principal nerve hairy beneath. Japan, &c. A pretty shrub, with slender terete twigs. (R. H. 1861, 352, under name of *L. amurense.*)

L. I. villosum (villous). A synonym of *L. sinense.*

L. japonicum (Japanese).* *fl.* white, slightly fragrant. June. *l.* oblong-ovate, somewhat acuminated. *h.* 6ft. to 8ft. Japan, 1845. A robust-growing evergreen shrub, with large coriaceous leaves. SYNS. *L. glabrum*, *L. Kellermanni*, *L. Sieboldii*, *L. syringæflorum.*

L. j. macrophyllum (large-leaved). A form with larger leaves than the type.

L. j. variegatum (variegated). *l.* margined and blotched with creamy-white.

L. Kellermanni (Kellermann's). A synonym of *L. japonicum.*

L. lancifolium (lance-leaved). A synonym of *L. compactum.*

L. longifolium (long-leaved). A synonym of *L. compactum.*

FIG. 408. LIGUSTRUM LUCIDUM, showing Leaf and Portion of Panicle.

L. lucidum (shining).* *fl.* white, in much-spreading panicles. Autumn. *l.* oval, ovate-lanceolate, elliptical, or nearly rotundate. *h.* 8ft. to 12ft. China, 1794. A very pretty evergreen species. SYNS. *L. magnoliæfolium*, *L. strictum.* See Fig. 408. (B. M. 2565.)

L. l. coriaceum (leathery). *fl.* greenish-white. Summer. *l.* dense, glossy, dark green, leathery, ovate-oblong, obtuse. *h.* 3ft. to 4ft. Japan, 1864. A pretty dwarf-growing evergreen, but not so hardy as the type. See Fig. 409.

L. magnoliæfolium (Magnolia-leaved). A synonym of *L. lucidum.*

L. Massalongianum (Massalongi's).* *fl.* white, numerously disposed in dense, terminal, much-branched panicles, and having a peculiar odour. Summer. *l.* glabrous, linear-lanceolate, mucronate, very shortly stalked. *h.* 6ft. Khasia Hills, 1877. A much-branched evergreen shrub, with ascending warted branches. Garden names of this species are: *L. angustifolium*, *L. myrtifolium*, *L. rosmarinifolium*, and *L. spicatum.* (G. C. n. s., xvi. 149.)

L. myrtifolium (Myrtle-leaved). A garden synonym of *L. Massalongianum.*

L. nepalense (Nepaul). A synonym of *L. spicatum.*

L. ovalifolium (oval-leaved).* *fl.* white; inflorescence thyrsiform. Summer. *l.* oval, oval-elliptic, or obovate, dark green above, lighter beneath, net-veined, shortly stalked. Japan. One of the hardiest and most floriferous of the Privets, more generally cultivated than *L. vulgare* on account of its larger, almost persistent, foliage.

L. o. variegatum (variegated).* Variegation a fine yellow in young leaves, passing into white as leaves get older. A vigorous, compact grower. SYN. *L. californicum robustum variegatum.* There are several other variegated forms of *L. ovalifolium.*

L. Quihoui (Quihou's). *fl.* white, in loose terminal panicles. Summer. *l.* dark green, oblong or oblong-ovate. Branches wiry, purplish, pubescent. China, 1868. (G. C. n. s., xviii. 277.)

L. rosmarinifolium (Rosemary-leaved). A garden synonym of *L. Massalongianum.*

L. Sieboldii (Siebold's). A synonym of *L. japonicum.*

Ligustrum—*continued.*

L. Simonii (Simon's). A synonym of *L. compactum.*

L. sinense (Chinese). *fl.* white, small; racemes coarctate. Summer. *l.* ovate-lanceolate, shining above and hairy beneath. *h.* 18ft. China, 1874. An evergreen or quasi-evergreen shrub, with slender pubescent branches. SYNS. *L. Ibota villosum* and *L. villosum.*

L. spicatum (spiked). *fl.* white, crowded, almost sessile, spicate, disposed in a thyrse, having the axis very hairy. Summer. *l.* elliptic, acute, hairy beneath, as well as the branchlets. *h.* 6ft. to 8ft. Nepaul, 1823. A hardy, deciduous species. SYN. *L. nepalense.* (B. M. 2921.)

L. spicatum (spicate). A garden synonym of *L. Massalongianum.*

L. strictum (upright). A synonym of *L. lucidum.*

L. syringæflorum (Syringa-flowered). A synonym of *L. japonicum.*

L. villosum (villous). A synonym of *L. sinense.*

FIG. 409. FLOWERING BRANCH OF LIGUSTRUM LUCIDUM CORIACEUM.

L. vulgare (common). Common Privet. *fl.* white at first, but changing to reddish-brown, sweet-scented; racemes compound, coarctate. Summer. *l.* elliptic-lanceolate, glabrous. *h.* 6ft. to 10ft. Europe (Britain), North Africa. (Sy. En. B. 904.) There are numerous varieties of this most useful shrub, of which the following is an excellent selection:

L. v. buxifolium (Box-leaved). A very distinct variety, differing from the type in its broader and more decidedly evergreen leaves.

L. v. fructu-luteum (yellow-fruited). Somewhat denser in its habit than the type, presenting a very pretty effect in autumn and winter when covered with its bright golden fruit. SYN. *L. v. xanthocarpum.*

L. v. pendulum (pendulous). This variety has long weeping branches, and, when grafted as a standard on a stem 4ft. or 5ft. high, forms an elegant specimen for a small lawn.

L. v. variegatum (variegated). A very pretty form, having the leaves prettily blotched with a bright golden colour.

L. v. xanthocarpum (yellow-fruited). A synonym of *L. v. fructu-luteum.*

LILAC. *See* **Syringa.**

LILIACEÆ. An extensive order of usually herbaceous perennials, very rarely annuals, sometimes frutescent and arborescent, natives of both temperate and tropical regions. Inflorescence mostly terminal, solitary, racemose, spiked, umbellate, or capitate, rarely panicled, furnished with scarious or spathaceous bracts. Leaves

MAXILLARIA SANDERIANA.

Liliaceæ—*continued.*

polymorphous, cauline, or radical. Root bulbous tuberous, fibrous-fascicled, or with a creeping rhizome. Liliaceæ are remarkable for the beauty of their flowers. The following is a selection of the principal genera cultivated for ornament: *Agapanthus*, *Fritillaria*, *Funkia*, *Hemerocallis*, *Hyacinthus*, *Lilium*, *Methonica*, *Scilla*, *Tulipa*, *Urginea*, &c. *Urginea* furnishes a large bulb, which is used medicinally under the name of Squill. Certain species of *Aloe* yield an extremely bitter resinous juice, much employed in medicine. The genus *Allium* supplies the Onion, Leek, Chive, Shallot, Rocambole, and Garlic. The order comprises upwards of 180 genera, and about 2500 species.

LILIUM (the old Latin name, akin to Greek *Leinon*, a Lily). Lily. ORD. *Liliaceæ*. This well-known genus comprises about forty-five species of hardy, half-hardy, or greenhouse bulbs, natives of the temperate regions of the Northern hemisphere. Flowers large, showy, either solitary at the tops of the stems, or many (or few) in a loose raceme; perianth deciduous, funnel-shaped or sub-campanulate; segments free, variable in shape, erect, spreading or reflexed; stamens six, hypogynous; racemes rarely sub-ramose, often spreading or pendulous, rarely erect. Leaves very variable, from rotundate-cordate to lanceolate or linear, sometimes arranged in regular whorls, sometimes having bulblets in the axils. Stems erect, leafy, simple, or rarely branched at apex. Bulbs various, mostly presenting the usual type of fleshy, imbricated, lanceolate scales, but rarely thick, wrapped in large membranous tunics.

The species are amongst the most beautiful and ornamental of cultivated bulbous plants, their stately habit and variously-coloured flowers (which are, in many cases, highly perfumed) rendering them indispensable subjects for greenhouse decoration, and for outside flower-garden embellishment. Nearly all the species and varieties may be termed hardy in most localities, if provided with a well-drained soil. As a precaution against injury to the bulbs from frost, it is well to cover them all the winter with a mound of ashes or cocoa-nut fibre, removing it again in spring. Valuable or scarce sorts should not be trusted outside permanently, unless their hardiness has been previously proved. The commoner and more plentiful species may be effectively employed for grouping or naturalising. Many of them are excellent border plants when in flower, being extremely attractive in mixed arrangements, if properly placed in respect of height. Many of the strong-growing Lilies are well adapted for planting amongst shrubs, where the latter are not too thickly placed. By growing a selection of species in pots, to flower at different times, a valuable addition to greenhouse decorative subjects is secured over a long period, in summer and autumn. Liliums are annually imported, in immense quantities, from Japan, particularly *L. auratum*. This is one of the best for pot culture, and one which succeeds well, planted outside, in peat beds, where the primary occupants, such as Azaleas, Rhododendrons, &c., preserve the bulbs from injury by frost in winter, and the tender flower-stems from cold and rough winds in spring. Evergreen shrubs such as those named, amongst several others, are surface-rooting, and their foliage shades the soil beneath from hot sun, and keeps it cool, in summer, these conditions being also most favourable to Lily culture. *L. bulbiferum*, *L. giganteum*, *L. longiflorum*, and *L. speciosum*, with each of the varieties of the last-named, are well adapted for culture, in pots, along with *L. auratum*.

Propagation. Liliums may be increased by seeds, by offsets, and sometimes by small bulblets which form in the axils of the leaves; the bulb scales, too, may be turned to account in propagating rare or distinct varieties. Seeds should be sown, when ripe, in well-drained pans

Lilium—*continued.*

of sandy peat, then slightly covered with similar soil and a layer of moss, and placed in a cool frame. They do not vegetate, as a rule, for several months; and, as it takes from four to six years to grow from seed bulbs large enough to produce flowers, the process is a slow one. The usual method of increase is by offsets, which are produced, in many instances, in great abundance round the old bulb, or amongst its scales. More than one flower-stem is often produced, and this has a tendency to cause the formation of a bulb for each, which may be detached for propagating purposes. Offsets vary in size, according to the species; they should be planted a few inches apart, in a prepared bed, and encouraged to grow quickly into flowering sizes. *L. bulbiferum* and *L. tigrinum* bear, in the axils of the leaves, quantities of

FIG. 410. YOUNG BULBLETS OF LILIUM.

bulblets, illustrations of which are shown in Fig. 410. They may be easily collected in summer, and, if planted like offsets, will soon grow, and eventually form flowering bulbs.

Cultivation. Where soils are light and naturally well drained, the few special requirements of different Lilies may be readily met by the addition of fresh soil at planting time—heavier or lighter, as the case may be. Nearly all the species prefer peat, and, where plenty of this is obtainable, some may, with advantage, be used, along with loam and leaf mould, or some other light manure. *L. candidum* prefers rather heavy loam, which should be of a good depth. It succeeds best on such soil when left alone for years in succession without being disturbed at the root. The beautiful pure white flowers of this common species are very attractive, early in summer. *L. tigrinum*, and its varieties, succeed in almost any position, as they are extremely hardy; the quality and size of their flowers are, however, very much superior when the soil is made rich, and plenty of water is given in summer. *L. Humboldtii*, *L. Martagon*,

FIG. 411. BULB OF LILIUM.

L. monadelphum, and *L. Washingtonianum*, amongst others, prefer moderately heavy loamy soil; *L. Catesbœi*, *L. Leichtlinii*, *L. pardalinum*, *L. philadelphicum*, and *L. tenuifolium*, may be recommended for planting in peaty soil in moist situations. Liliums prefer a partial shade,

MISSOURI BOTANICAL GARDEN

Lilium—*continued.*

but not a position overhung with trees. Protection from high winds is also an important point with plants growing to such a height as these. Early autumn, after the stems have ripened off, is the best time for lifting or replanting. Lily bulbs should not be allowed to lie out of the ground, or be exposed to the weather, longer than can possibly be helped. They are, as described above, mostly composed of a number of fleshy scales (see Fig. 411), which contract and become withered under the drying influence of the open air. This alone is a sufficient explanation of the numerous failures with purchased bulbs—the length of time they may have been stored in the seedsmen's shops. From 4in. to 6in. is a suitable depth for planting. A number of roots proceed from the stem above the bulb each year, and a less depth than this would not allow of their being covered with soil. A mulching of rotten manure, and plenty of water, are of great assistance in developing the flowers, if applied as soon as they are sufficiently advanced to be seen. The flower shoots should not be cut off before they have thoroughly ripened.

Cultivation in Pots. As previously remarked, a few of the Liliums are indispensable conservatory plants, and must, consequently, be amenable to culture in pots. Loam and peat, in about equal parts, with some charcoal or sharp sand added, will be a suitable compost. Potting should be performed when the bulbs are at rest in autumn. Those which are imported are largely cultivated in this way, but they seldom have the strength and solidity of those which are home grown; the latter are, however, much more expensive. A very large proportion of the imported bulbs of *L. auratum* never live to flower. Unfortunately, they have the appearance of being sound, and of good quality, on arrival; but the possibility of their being collected and packed in an immature state, and the injurious effect consequent on travelling, have each their evil results in causing the bulbs to rot when they are placed in soil. It is best to defer purchasing until towards spring, as then there is a likelihood of the bulbs being at least better ripened, and in a more suitable condition for starting quickly. They should be placed singly in well-drained pots, half filled with light soil, and be only partially covered. The cause of evil, to be frequently looked for and removed, is the presence of a fungus amongst the scales, which causes them, and also the base, to get rotten. A little dry, pounded charcoal should be shaken amongst the scales, and placed beneath each bulb, when potting. Only a slight syringing occasionally will be required until growth commences—a time which will be indicated by the appearance of roots, and the formation of a shoot in the centre. The pots may then be filled up, or the bulbs transferred to larger ones, if those in which they are already placed are less than 6in. in diameter. In either case, deep potting should be the aim, as it is very important that the upper roots should be in contact with good soil. As the flowering stage arrives, liquid manure may be given with advantage, but it should not be applied previous to this. Any imported Liliums should be treated at first as above described; those which are home grown do not usually require such precautions to induce them to start. After flowering is over, the plants should be placed in the open air, water being gradually withheld as they begin to ripen. Those intended for late summer flowering may be grown in a shady position outside, after the middle of May. Repotting for the succeeding year should be practised in the autumn, and the pots, with their contents, stored, during winter, in a cool, but not over-dry, place.

Mr. Baker's admirable analysis of the present genus, by the help of which the correct name of any species in cultivation may be determined, is given below:

Lilium—*continued.*

SUB-GENUS I. *Cardiocrinum.*

Perianth funnel-shaped, with oblanceolate segments, falcate only at the apex. Leaves stalked, cordate-ovate . . . . . — *L. cordifolium.* *L. giganteum.*

SUB-GENUS II. *Eulirion.*

Perianth funnel-shaped, with oblanceolate segments, which are falcate only at the apex. Leaves linear or lanceolate, sessile or nearly so.

- Tube scarcely widened from the base to the middle . . . . . — *L. longiflorum.* *L. neilgherrense* *L. philippense.* *L. Wallichianum.*
- Tube gradually narrowing from the base to the neck. Leaves scattered . . — *L. candidum.* *L. japonicum.* *L. Krameri.* *L. nepalense.*
- Leaves in whorls . . . . . — *L. Parryi.* *L. Washingtonianum.*

SUB-GENUS III. *Archelirion.*

Perianth open, funnel-shaped, with deeply-spreading segments, which are broadest below the middle; stamens diverging from the curved style.

- Leaves sessile . . . . . — *L. oxypetalum.* *L. tigrinum.*
- Leaves shortly stalked . . . . — *L. auratum.* *L. speciosum.*

SUB-GENUS IV. *Isolirion.*

Perianth erect, with segments which are falcate in the extended flower, but not revolute; stamens diverging on all sides from the straight style.

- Leaves in whorls . . . . . — *L. medeoloides.* *L. philadelphicum.*
- Leaves scattered. Style shorter than ovary . . . . . — *L. concolor.*
- Style longer than the ovary . . — *L. bulbiferum.* *L. Catesbœi.* *L. croceum.* *L. davuricum.* *L. elegans.*

SUB-GENUS V. *Martagon.*

Perianth cernuous, with the segments very revolute; stamens diverging on all sides from the curved style.

Leaves in whorls.

- American species. Bulbs annual, bearing rhizomes . . . . . — *L. canadense.* *L. nitidum.* *L. pardalinum.* *L. Razlei.* *L. superbum.*
- Bulbs perennial, hardly rhizomiferous . . . . . — *L. columbianum.* *L. Humboldtii.*
- Old World species . . . . — *L. avenaceum.* *L. Hansoni.* *L. Martagon.*

Leaves scattered.

- Leaves lanceolate, many-nerved. Perianth falcate above the middle — *L. monadelphum.*
- Perianth revolute to below the middle . . . . . — *L. carniolicum.* *L. polyphyllum.*
- Leaves narrowly linear, with one or few nerves. Segments of the perianth from six to twelve lines broad in the middle . . . . . — *L. Leichtlinii.* *L. pseudo-tigrinum.* *L. testaceum.*
- Segments of the perianth from three to six lines broad in the middle . . . . . — *L. callosum.* *L. chalcedonicum.* *L. pomponium.* *L. tenuifolium.*

SUB-GENUS VI. *Notholirion.*

Stigma trifid (in all the representatives of the other sub-genera, the stigma is only faintly three-lobed) . . . . . — *L. Hookeri.* *L. roseum.*

L. alternans (alternating). A garden synonym of *L. elegans bicolor.*

L. aurantiacum (orange-red). A synonym of *L. elegans.*

L. aurantiacum (orange-red), of gardens. A synonym of *L. elegans bicolor.*

L. auratum (golden).* Golden-rayed Lily of Japan. *fl.* ivory-white, with a distinct central band of bright yellow and numerous deep purple spots, the lower part copiously papillose, from 10in. to 12in. across when expanded; raceme deltoid, often twenty-flowered; peduncles rigidly erecto-patent. Summer. *l.* about thirty at the flowering time, spreading or deflexed, linear-lanceolate; the lower ones 6in. to 9in. long, nine to fifteen lines broad below the middle, acuminate. Stem 2ft. to 4ft. high, rigid, erect, purplish-green, terete. Japan, 1862. A really splendid plant, of which a large number of varieties are in cultivation. See Fig. 412. (B. M. 5338; F. d. S. 1528-31; I. H. ix. 338; R. H. 1867, 371.)

Lilium—*continued.*

L. autumnale (autumnal). A synonym of *L. superbum carolinianum.*

L. avenaceum (Oat-like). *fl.* few, sometimes sub-umbellate, on pedicels 2in. to 3in. long; perianth fine reddish-yellow, slightly scented, 1¼in. to 1½in. long; segments lanceolate, about ½in. broad, cucullate at apex, minutely dotted. *l.* horizontal, oblanceolate, 3in. to 4in. long, ½in. to 1½in. broad, glabrous, tender, sometimes partly whorled. Stem glabrous, terete, 1½ft. to 2ft. high. Japan, &c., 1865. (R. G. 485.)

L. Bloomerianum (Bloomer's). A synonym of *L. Humboldtii.*

L. Brownii (Brown's). A synonym of *L. japonicum Brownii.*

L. bulbiferum (bulb-bearing).* *fl.* red, slightly cottony on the outside, 2in. to 2½in. long, permanently erect; raceme sometimes congested into an umbel, twelve to eighteen-flowered. Summer. *l.* irregularly scattered, fifty to sixty to a stem at the flowering time, linear, erecto-patent, sessile, the upper ones bearing clustered or solitary, stalked or sessile, chestnut-brown bulblets in their axils. Stem 2ft. to 4ft. high, rigid, erect, sulcate, pubescent. Bulb ovoid, the outer scales 1in. deep. Europe, 1820. A very desirable garden plant. See Fig. 413. (B. M. 1018; J. F. A. 226.)

L. bulbiferum (bulb-bearing), of De Candolle. A synonym of *L. croceum.*

L. callosum (callous-bracted). *fl.* bright scarlet, drooping, 1¼in. to 1½in. deep, about a dozen in a narrow, regular, thyrsoid raceme; peduncles 1in. to 1½in. long, subtended by a pair of small bracts, which are curiously indurated, and hood-shaped at the tip. Summer. *l.* ascending, about thirty to a stem at the flowering time; lower ones 4in. to 5in. long, scarcely over ⅛in. broad at the middle, having a long acute point; edge slightly recurved. Stem 2ft. to 3ft. high, moderately slender, sub-terete. Japan, 1840. (S. Z. F. J. ix. 41.)

FIG. 412. INFLORESCENCE OF LILIUM AURATUM.

L. canadense (Canadian).* *fl.* varying in colour from bright yellow to pale bright red, with copious spots, especially in the lower two-thirds, of purplish-red corymbose, pendulous; perianth 2in. to 2½in. long, the divisions much less reflexed than those of *L. Martagon.* Summer. *l.* typically in four or five regular whorls, 2in. to 3in. apart, of six to fifteen oblanceolate leaves, spreading nearly horizontally, narrowed gradually to an acute point. Stem 1½ft. to 3ft. high, erect, terete. Bulb more or less obliquely rhizomatous. North America, 1829. SYN. *L. penduliflorum.* See Fig. 414. (B. M. 800, 858; F. d. S. 1174.)

L. c. parvum (small). *fl.* loosely corymbose, drooping, on very slender pedicels 3in. to 4in. long; perianth bright orange-red, 1in. to 1¼in. long, the tube greenish externally, the segments oblanceolate, spotted with dark red-purple about the throat. June. *l.* scattered or whorled, or both, on the same stem, lanceolate or oblong-lanceolate, 1½in. to 2in. long. Stem slender, 1½ft. to 2ft. high. California. (B. M. 6146; R. G. 725.)

L. candidum (white).* St. Joseph's Lily. *fl.* pure pearl-white, very rarely tinged with purple on the outside, 2in. to 3in. long, the upper ones more or less ascending, the lower drooping; racemes from five to ten or even twenty-flowered, thyrsoid.

Lilium—*continued.*

FIG. 413. FLOWER-STEM OF LILIUM BULBIFERUM.

June. *l.* six to two hundred, much crowded in the lower half, erecto-patent, linear, the lowest reaching 6in. to 8in. long, ½in. to 1in. broad above the middle. Stem 2ft. to 3ft. high, stiff, erect, six to nine lines thick at the base. South Europe, 1596. A very handsome and common species. See Fig. 415. (B. M. 278.)

FIG. 414. LILIUM CANADENSE, showing Habit and detached Single Flower.

Lilium—*continued.*

L. c. peregrinum (foreign). *fl.* rather smaller than those of the type; divisions a little narrower. *l.* also narrower and fewer. The whole plant more slender in habit. SYN. *L. peregrinum* (under which name it is figured in S. B. F. G. ser. ii. 367).

L. c. spicatum (spicate). A garden form, with petaloid white bracts.

FIG. 415. FLOWER-STEM OF LILIUM CANDIDUM.

L. c. striatum (striated). *fl.* having the segments striped with purple externally. (F. d. S. 735.)

L. carniolicum (Carniolian). *fl.* bright orange-yellow, passing sometimes into scarlet, 1½in. to 2in. long; peduncles 2in. to 3in. long. June and July. *l.* thirty to forty, always scattered, much-ascending, linear-lanceolate, acute, the edge minutely ciliated. Stem 2ft. to 3ft. high, stout, erect. Bulb ovoid, with lanceolate scales 1in. deep. South Europe, &c.

L. carolinianum (Carolina). A synonym of *L. superbum carolinianum*.

L. Catesbæi (Catesby's).* *fl.* bright orange-red, copiously spotted with purple, solitary, 3in. to 4in. long. Summer. *l.* never whorled, twenty to thirty, ascending, sessile; lower ones lanceolate, acute; the upper ones growing gradually smaller and narrower, and ceasing from 1in. to 2in. below the flower. Stem 1ft. to 2ft. high, slender, erect, straight. North America. (B. M. 259; L. B. C. 807; S. B. F. G. ser. ii. 185.)

L. chalcedonicum (Chalcedonian).* *fl.* bright scarlet, rarely yellowish, from one to six, sub-corymbose, pendulous; peduncles 3in. to 4in. long. Summer. *l.*, at the flowering time, fifty to eighty, lower ones sub-patent, upper ones ascending, all scattered, linear. Stem stiff, erect, 2ft. to 3ft. high, striated. Greece, 1796. See Fig. 416. (B. M. 30; F. d. S. 2160.) An old and well-known garden favourite. There is a very desirable form, *majus*; and another, *græcum*, having smaller flowers, but a taller habit than the type.

L. colchicum (Colchican). A synonym of *L. monadelphum Szovitsianum*.

L. columbianum (British Columbian). *fl.* two or three, umbellate, on slender pedicels 2in. to 4in. long; perianth of a splendid reddish-orange, 1½in. to 2in. long, the lanceolate segments dotted with purple and reflexed. *l.* few; lower ones disposed in four or five-leaved whorls; upper ones sparse, oblanceolate, acute, 1½in. to 2in. long, about ½in. broad. Stem 1½ft. to 2ft. high, slender, glabrous. Oregon, British Columbia, 1872.

L. concolor (one-coloured). *fl.* bright scarlet, 1½in. to 2in. long,

Lilium—*continued.*

disposed in corymbs of five or six; peduncles erecto-patent. Summer. *l.* twenty to thirty at the flowering time, scattered irregularly, spreading, lanceolate, the lower ones 3in. to 4in. long, narrowed to both ends. Stem 1ft. to 3ft. high, erect, sub-terete, obscurely pubescent. Bulb ovoid, about 1in. deep. China, 1806. (B. M. 1165.) SYN. *L. sinicum* (F. d. S. 1206; I. H. 100).

L. c. Buschianum (Busch's).* *fl.* splendid scarlet, lower portion of segments bearing numerous small black spots. *l.* narrow, deep green. Southern Siberia. (L. B. C. 1628; B. M. 6005, under name of *L. c. sinicum*.)

L. c. Coridion (Coridion). *fl.* bright yellow, scattered over, principally on the lower half of the face, with distinct reddish-brown spots, solitary. Japan. (R. G. 885.)

L. c. Partheneion (Partheneion). *fl.* bright red-yellow, faintly spotted on the face, solitary. Japan.

FIG. 416. FLOWER-STEM OF LILIUM CHALCEDONICUM.

L. c. pulchellum (pretty). *fl.* bright scarlet, with a few faint spots of black, erect, twelve to fourteen lines long, solitary in the wild plants, but produced in half-dozens under cultivation. *l.* twenty to thirty at the flowering time, scattered irregularly, narrow-linear, ascending. Stems slender, 6in. to 12in. high, slightly sulcate. Bulb ovoid, about the size of a hazel-nut; the scales few, fleshy, ovate, snow-white. Mongolia, &c., 1834. A very pretty little variety, rarely seen in cultivation. SYN. *L. pulchellum*. See Fig. 417. (R. G. 1860, 284, Fig. 2.)

L. c. sinicum (Chinese). A synonym of *L. c. Buschianum*.

L. cordifolium (heart-shape-leaved).* *fl.* white, yellow, purple; perianth narrow, funnel-shaped; racemes four to ten-flowered; pedicels floriferous, spreading; anthers yellow. August. *l.*, primordial ones tinged with blood-colour; stem ones deeply cordate, on long petioles. Stem 3ft. to 4ft. high. Japan, 1853. SYN. *Hemerocallis cordata*.

Lilium —*continued.*

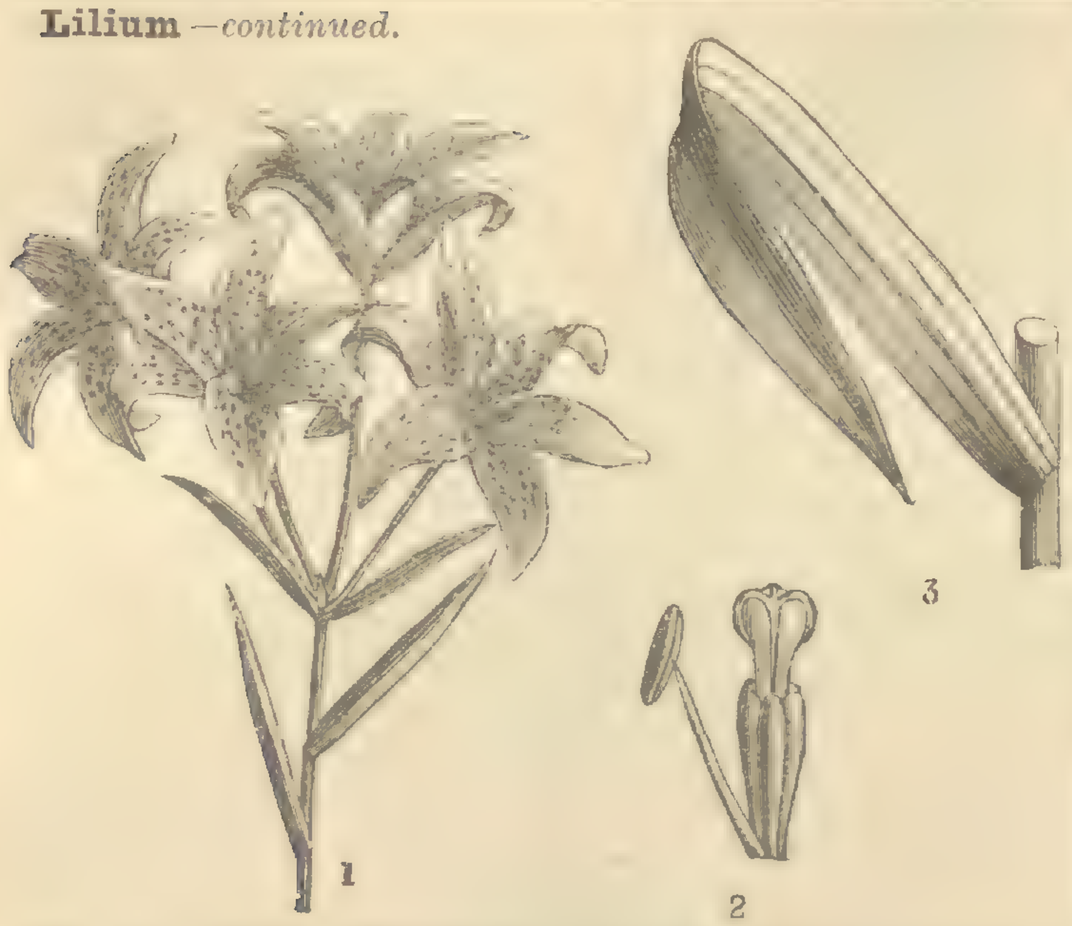

FIG. 417. LILIUM CONCOLOR PULCHELLUM, showing (1) Inflorescence, (2) Ovary and Anther, and (3) Portion of Stem, with Leaf.

L. coruscans (glittering). A garden synonym of *L. elegans atrosanguineum.*

FIG. 418. LILIUM DAVURICUM, showing Habit and detached Inflorescence.

L. croceum (yellow).* *fl.* disposed in deltoid or umbellate racemes; perianth erect, broadly funnel-shaped; segments beautiful golden, slightly scarlet-tinted. July. *l.* scattered, clustered, spreading, or at length lightly squarrose, linear; inferior ones sessile, glabrous, firm. Stem 3ft. to 6ft. high, purple-spotted, more or less cobwebby. South Europe. SYN. *L. bulbiferum* (of De Candolle) (under which name it is figured in B. M. 36).

FIG. 419. LILIUM ELEGANS, showing Habit and detached Flower.

Lilium —*continued.*

L. davuricum (Dahurian).* *fl.* umbellate or shortly racemose; perianth beautiful scarlet; pedicels naked or lightly cobwebby. July. *l.* sessile, linear, trinerved. Stem 2ft. to 3ft. high, slender, green. Siberia, 1745. SYNS. *L. pennsylvanicum* (B. M. 872), *L. spectabile* (R. G. 349). See Fig. 418. (B. M. 1210; R. G. 740.)

L. elegans (elegant).* *fl.* pale scarlet-red, scarcely at all spotted, from 5in. to 6in. across when expanded. July. *l.* broader than in the other forms, lanceolate, sometimes 1in. wide, without bulblets in their axils. Stem one or two-headed. Japan, 1835. SYNS. *L. aurantiacum* (P. M. B. vii. 127), *L. lancifolium, L. Thunbergianum* (B. R. 1839, 38). See Fig. 419.

L. e. alutaceum (ornamentally-dotted). *fl.* solitary; perianth pale apricot colour; interior of segments copiously dotted with purple. Stem dwarf. SYN. *L. Thunbergianum aureum nigromaculatum* (under which name it is figured in F. d. S. 1627).

L. e. armeniacum (apricot-colour).* *fl.* golden-spotted, one or two. *l.* thirty to forty; inferior ones linear. Stem under 1ft. high.

L. e. atrosanguineum (dark red).* *fl.* very often solitary; segments broad, blotched with red. SYN. *L. coruscans*, of gardens.

FIG. 420. LILIUM GIGANTEUM.

Lilium—*continued.*

L. e. bicolor (two-coloured). *fl.* orange-red, with purplish-black spots. 1870. SYN. *L. aurantiacum*, of gardens.

L. e. brevifolium (short-leaved). *fl.*, perianth pale red, black-spotted. July. *l.* shorter and broader than in the type. Japan. SYN. *L. alternans*, of gardens.

L. e. citrinum (orange-coloured). This scarcely differs from *L. e. armeniacum*. (F. d. S. 2319.)

L. e. fulgens (bright). A variety having flowers blotched with red. (I. H. 657.) *Batemanni* is a splendid form of this.

L. e. pardinum (leopard-spotted). This variety scarcely differs from *L. e. bicolor*, but the stem is taller, and the flowers are umbellate.

L. e. sanguineum (blood-coloured).* *fl.*, segments blood-red, mixed with golden. *l.* lanceolate. Stem 1ft. to 1½ft. high. (B. R. 1846, 50.)

Other varieties are: *hæmatochroum* (I. H. 503), with deep claret-red flowers, and *venustum* (B. R. xxxii. 50), both with narrower leaves and more campanulate flowers.

L. excelsum (tall). A synonym of *L. testaceum*.

L. eximium (choice). A synonym of *L. longiflorum eximium*.

FIG. 421. LILIUM HANSONI, showing Habit and detached Flower.

L. giganteum (giant).* *fl.* white, slightly tinged with green on the outside, and with purple in the throat, funnel-shaped, 5in. to 6in. long, measuring about 1in. round at the base, saccate, especially on the lower side, and 5in. to 6in. round the neck when fully expanded, the segments spreading only at the very tip; raceme from six to twelve-flowered, and from 12in. to 20in. long. Summer. *l.* all, except the uppermost, distinctly stalked; the lower ones 6in. apart, with broad channelled petioles 1ft. or more long, clasping the stem broadly at the base; the blade broad cordate-ovate, reaching 1ft. or even 1½ft. in length; upper leaves growing gradually smaller and closer till those beneath the raceme are not more than 3in. to 4in. long. Stem straight, erect, terete, 4ft. to 10ft. high, 1in. to 2in. in diameter in the lower part. Bulb as large as an apple, of fleshy, ovate, sub-patulous scales. Himalayas, 1852. A splendid species, hardy only in favoured spots in the South of England, &c. See Fig. 420. (B. M. 4673.)

FIG. 422. FLOWERS OF LILIUM LONGIFLORUM.

L. Hansoni (Hanson's).* *fl.* four to ten, disposed in a loose raceme, or in a crowded umbel, on erecto-patent pedicels, 1½in. to 2in. long; perianth fine reddish-orange, 1¼in. to 1½in. long, with thick, lanceolate, profoundly falcate-revolute, purple-dotted segments. *l.* oblanceolate, acute, tender, glabrous, often eight to twelve in one whorl at the middle of the stem, 4in. to 5in. long, ⅜in. to 1in. broad. Stem 3ft. to 4ft. high, slender, glabrous, terete. Japan, 1865. See Fig. 421.

L. Harrisii (Harris's). A synonym of *L. longiflorum eximium*.

L. Hookeri (Hooker's). This is the correct name of the plant described in this work as *Fritillaria Hookeri*.

L. Humboldtii (Humboldt's). *fl.* often six to ten, sometimes thirty or forty, disposed in a broad deltoid panicle; perianth of a splendid reddish-orange colour, greenish outside at base; segments copiously purple-veined, acute, closely reflexed. *l.* usually regularly verticillate, in ten to fifteen-foliate whorls, oblanceolate; lower ones 4in. to 5in. long, nearly 1in. broad. Stem terete, robust, 4ft. to 5ft. high, glabrous or puberulous, reddish-spotted. Bulb 2in. to 4in. thick. California, &c., 1872. SYN. *L. Bloomerianum*. (F. d. S. 1973-4; R. G. 724.) The variety *ocellatum* has a yellow perianth, conspicuously dotted with purple.

L. isabellinum (Isabel-coloured). A synonym of *L. testaceum*.

L. japonicum (Japanese).* *fl.* pure white within, but more or less tinged with purple on the outside, 5in. to 6in. long, more or less ascending, usually solitary in the wild plant, and not more than in twos or threes in the cultivated one; perianth broader round the neck than in *L. longiflorum*. Summer. *l.* twelve to twenty, scattered, more spreading than those of *L. longiflorum*, oblanceolate, the lower ones reaching 4in. to 6in. long, not distinctly petiolate. Stem 1ft. to 2ft. high, erect, stiff, terete. Japan, 1804. A very handsome but somewhat delicate species. (B. M. 1591; L. B. C. 438.) SYN. *L. odorum* (F. d. S. 876-7).

L. j. Brownii (Brown's). *fl.* sometimes three or four, 7in. to 8in. long, more drooping than those of the type, tinged with purple on the outside. Stem 3ft. to 4ft. high, marked with dark purple spots and streaks. (F. d. S. 47, 2248, under name of *L. Brownii*.)

L. Krameri (Kramer's).* *fl.* white, slightly reddish, sweet-scented; perianth horizontal, solitary, broadly funnel-shaped, 6in. to 7in. long, with oblanceolate oblong segments. July. *l.* distant, sparse, linear-lanceolate, acuminate, very shortly petiolate, firm, 6in. to 9in. long, ½in. to ¾in. broad. Stem 3in. to 4in. high, slender terete, glabrous, purple-spotted. Japan. (B. M. 6058.)

L. lancifolium (lance-shape-leaved). A synonym of *L. elegans*.

L. Leichtlinii (Leichtlin's).* *fl.* one or two, bright yellow, spotted copiously down the face with large purplish-red dots, tinged with purple outside, inside spotted with vinous-red, 2½in. to 3in. long; pedicels erecto-patent. July and August. *l.* all scattered, somewhat loose, erecto-patent; lower ones 3in. to 4in. long, ¾in. to ⅞in. broad below the middle, with a long acute point. Stem 2ft. to 3ft. high, moderately slender. Japan, 1867. (B. H. 1869, 11; B. M. 5673; F. d. S. 1736; F. M. 509; I. H. 540.)

L. L. majus (large). This is a luxuriant form, attaining a height of 5ft. The flowers are yellow, purple-black spotted. Japan, 1872.

Lilium—*continued.*

L. L. Maximowiczii (Maximowicz's). *fl.* three or four, the groundwork of colour bright scarlet. Stem dark purplish-brown, more distinctly cottony than in the type. SYN. *L. Maximowiczii* (R. G. 1868, 596).

L. L. platypetalum (broad-petaled). *fl.* bright pale red; perianth segments broader than in the type.

L. L. tigrinum (tiger-spotted). *fl.* orange-scarlet, thickly dotted with dark purple. *l.* erecto-patent, recurved at apex. (R. G. 664, under name of *L. Maximowiczii tigrinum.*)

L. linifolium (Flax-leaved). A synonym of *L. tenuifolium.*

L. Loddigesianum (Loddiges'). A synonym of *L. monadelphum.*

L. longiflorum (long-flowered).* *fl.* pure white, fragrant, 5in. to 7in. long, shaped like a funnel with a neck, solitary or in twos, horizontal or slightly drooping. June. *l.* twenty to thirty at the flowering time; the lower ones crowded, erecto-patent, 3in. to 5in. long, linear, three to six lines broad about the middle, acute. Stem 1ft. to 2ft. high, stiff, terete, erect. Japan, China, &c., 1862. A very handsome species. See Fig. 422. (B. R. 560; F. d. S. 270; L. B. C. 985.)

L. l. eximium (choice).* *fl.* white, large, infundibuliform-campanulate; limb segments revolute, firm, undulated, outer ones narrow and acutely callous at apex; inner ones narrower and obtusely rotundate at apex. *l.* few, clustered, narrow-lanceolate. Japan. SYN. *L. Harrisii.* (F. d. S. 283, 284, under name of *L. eximium.*)

FIG. 423. FLOWER-STEM AND DETACHED FLOWER OF LILIUM MARTAGON.

L. Martagon.* Martagon, or Turk's Cap Lily. *fl.* of a dull purplish-red, with copious spots of dark purple, pendulous, 1¼in. to 1½in. deep; raceme more regularly pyramidal than that of any other species, reaching, in fine specimens, 1ft. in length, and sometimes nearly twenty-flowered. Summer. *l.* typically in three or four regular whorls of six to nine leaves each, with a few scattered ones placed usually between the uppermost and the inflorescence, oblanceolate-spathulate, acute. Stem 2ft. to 3ft. high, erect, terete, more or less pubescent. Bulb ovoid, 1in. to 1½in. thick; scales bright yellow. Europe, Asia, 1596. A very distinct and largely-grown species. See Fig. 423. (B. M. 893, 1634; J. F. A. 351; Sy. En. B. 1518.)

L. Maximowiczii (Maximowicz's). A synonym of *L. Leichtlinii Maximowiczii.*

L. M. tigrinum (tiger-spotted). A synonym of *L. Leichtlinii tigrinum.*

L. medeoloides (Medeola-like). *fl.* splendid orange-red, with a few purple spots, about 1½in. long, solitary, or in umbels of two or three. *l.* either in a single whorl of seven to fourteen at the middle of the stem, or a few scattered, oblanceolate, similar to those of *L. Martagon*, 4in. to 6in. long. Stem 1ft. to 2ft. high, slender, terete, flexuose. Japan, 1878. A very distinct species, but probably not yet in cultivation.

L. Michauxianum (Michaux's). A synonym of *L. superbum carolinianum.*

L. monadelphum (monadelphous).* *fl.* pale bright yellow, tinged round the base with claret-red, 2½in. to 3½in. long, disposed in terminal pyramidal clusters. Autumn. *l.* always scattered, thirty to fifty to a stem, much-ascending, linear-lanceolate, acute, distinctly ciliated at the edge. Stem stout, erect, 3ft. to 5ft. high. Caucasus and Northern Persia, 1820. (B. M. 1405; R. G. 733.) SYN. *L. Loddigesianum* (P. F. G. 58).

L. m. Szovitsianum (Szovits').* This differs from the type in having the "filaments free to the base, perianth reflexed from rather lower down, with segments broadest a little below the middle." The pollen is said to be deeper in colour. SYNS. *L. colchicum, L. Szovitsianum* (F. d. S. 507-9).

L. neilgherrense (Neilgherries).* *fl.* white, sweet-scented, one to three, ascendent; perianth narrow, funnel-shaped; segments oblanceolate-unguiculate. *l.* glabrous, shining-green, ascendent, firm, three to five-nerved. Stem 2ft. to 3ft. high, upright. Neilgherries. Greenhouse. SYNS. *L. tubiflorum, L. Wallichianum.* (B. M. 6332.)

L. nepalense (Nepaulese). *fl.* white, more or less suffused with purple on the outside towards the base, from 4in. to 5in. long, solitary, umbellate, or laxly racemose, about six-flowered, narrow, thyrsoid. *l.* thirty to fifty, scattered, linear-lanceolate; the lower ones 3in. to 4in. long, six to nine lines broad in the middle, acute, erecto-patent. Stem 1½ft. to 3ft. high, erect, ¼in. thick at the base. Central Himalayas, &c., 1855. Greenhouse.

L. nitidum (bright). *fl.* bright yellow, 1½in. long; panicle deltoid, 6in. to 12in. long, from ten to twenty-flowered; lower pedicels 2in. to 3in. long. *l.* up to twenty in a whorl, lanceolate, 1½in. to 2in. long. Stem 1½ft. long below the inflorescence, stout, terete. Bulb transversely oblong, with crowded, adpressed, lanceolate, white scales. California, 1880.

L. odorum (odorous). A synonym of *L. japonicum.*

L. oxypetalum (sharp-petaled).* *fl.* solitary, terminal, somewhat drooping, at first campanulate, at length spreading; sepals lilac-purple, with a green keel externally, the lower half within purple-dotted, ovate or ovate-oblong, acute, clawed at base. June. *l.*, radical ones usually solitary, long, lanceolate, tapering to a petiole-like base; cauline ones distant, linear or linear-lanceolate, at length recurved. Stem 1ft. to 1½ft. high. Pindari, Kumaon. (B. M. 4731, under name of *Fritillaria oxypetala.*)

L. pardalinum (leopard-spotted).* *fl.* bright orange-red, with a lighter orange centre and large purple spots on the lower half, nodding, racemose, or the lower in whorls or long spreading pedicels. Summer. *l.* usually in three or four whorls of nine to fifteen, scattered above and below, narrowly lanceolate and sharply acuminate, 3in. to 7in. long, and three to twelve lines broad. Stems 5ft. to 7ft. long. California, 1875. A very handsome North American Lily, of which the following are the most distinct varieties: *Bourgæi*, one of the finest, producing stout stems, 6ft. to 7ft. in height, bearing from twelve to twenty flowers of a bright crimson, shading to orange, and freely spotted with maroon; *californicum*, a variety of more slender habit, growing from 5ft. to 4ft. in height, the brightest coloured of the forms here mentioned; *pallidiflorum*, a dwarf variety, scarcely reaching 5ft. in height, flowers nearly double the size of the type, and paler in colour; *Robinsoni*, a robust variety, having stout stems, 7ft. to 8ft. in height, and massive, the flowers large, of a bright vermilion, shading to yellow, and freely spotted.

L. Parryi (Parry's).* *fl.* pale yellow, copiously spotted with chocolate-red, fragrant, horizontal. Summer. *l.* usually scattered, occasionally the lower ones in a whorl, linear-lanceolate, 4in. to 6in. long, acuminate. Stem slender, 2ft. to 6ft. high. California, 1879. A distinct and handsome species.

L. penduliflorum (pendulous-flowered). A synonym of *L. canadense.*

L. pennsylvanicum (Pennsylvanian). A synonym of *L. davuricum.*

L. peregrinum (foreign). A synonym of *L. candidum peregrinum.*

L. philadelphicum (Philadelphian).* *fl.* bright orange-red usually spotted with purple in the lower half, 2in. to 3in. deep, under 2in. across at the mouth when expanded, solitary or umbellate; peduncles ascending, arcuate, or straight. Summer. *l.* typically in four or five regular whorls of six to eight each, 2in. to 4in. apart, spreading, narrowly oblanceolate, narrowed at both

Lilium—*continued.*

ends. Stem 1ft. to 3ft. high, rigid, slender. Bulb ovoid, 1in. thick. North America, 1754. (B. M. 519; B. R. 594; L. B. C. 976.)

L. p. andinum (Andes). This variety differs principally from the type in having all its leaves linear and scattered.

L. philippense (Philippines). *fl.* horizontal, solitary; perianth white, slightly tinged with green at the base externally, narrow funnel-shaped, 7in. to 10in. long, sweet-scented, the divisions remaining permanently imbricated in the lower three-quarters, spreading falcately in the upper quarter, the three inner about 2in., and the three outer 1½in., broad; stamens a little exserted. August. *l.* thirty to forty, loosely scattered down the stem, narrow-linear, sessile, falcate-ascending, 3in. to 4in. long, ⅛in.

FIG. 423. LILIUM POMPONIUM, showing Habit and detached Flower.

to ⅛in. broad, acute, glabrous, with narrowly-decurved edges not at all ciliated. Stem 1½ft. to 2ft. high, slender, terete, glabrous, sometimes slightly mottled with purple. Philippine Islands. (B. M. 6240.)

L. polyphyllum (many-leaved). *fl.* waxy-white, copiously spotted and lined with purple, 1½in. to 2in. long, drooping, about four to six in a loose raceme; peduncles 2in. to 4in. long, stiff. Summer. *l.* all scattered, thirty to forty to a stem at the flowering time, much-ascending, linear-lanceolate; the lower ones 4in. to 5in. long, acute. Stem 2ft. to 3ft. high, moderately stout,

FIG. 425. FLOWER OF LILIUM PYRENAICUM.

Lilium—*continued.*

terete. Temperate Western Himalaya, 1873. A rare and handsome greenhouse species.

FIG. 426. LILIUM ROSEUM, showing Habit and detached Portion of Raceme.

L. pomponium (Pompone).* *fl.* bright red or tinged with orange, about twenty, arranged in a broad, rather regular, thyrsoid raceme, which is sometimes 1ft. long and broad; lower pedicels 3in. to 4in. long. Summer. *l.* always scattered, very numerous, as many as 100 to a stem, ascending; lower ones 3in. to 4in. long, ⅛in. to ¼in. broad at the middle, narrowed gradually to the point; edges inrolled, distinctly ciliated. Stem 1½ft. to 3ft. high, strong,

FIG. 427. LILIUM SPECIOSUM ROSEUM.

Lilium—*continued.*

stiff, erect, finely furrowed. Northern Italy and Southern France, &c., 1659. See Fig. 424. (B. M. 971.)

L. pseudo-tigrinum (false tiger-spotted).* *fl.* in four to six-flowered loose racemes; perianth beautiful scarlet, copiously dotted with black within; segments ovate-lanceolate; pedicels erecto-patent; filaments scarlet; anthers red; styles scarlet. July. *l.* scattered, linear, broad, recurved, spreading; margins revolute. Stem 3ft. to 4ft. China, 1867. (R. H. 1867, 410.)

L. pulchellum (pretty). A synonym of *L. concolor pulchellum.*

L. pumilum (dwarf). A synonym of *L. tenuifolium.*

L. pyrenaicum (Pyrenean).* *fl.* bright yellow, 1½in. to 2in. long, pendulous, forming, in well-grown plants, a raceme of about twelve blossoms; lowest peduncles 3in. to 4in. long. Summer. *l.* always scattered, very numerous, as many as 100 to a stem, erecto-patent, acute; edge slightly inrolled, distinctly minutely-ciliated. Stem 2ft. to 4ft. high, strong, stiff, erect, finely furrowed. Pyrenees, 1596. See Fig. 425. This is closely allied to *L. pomponium*, under which it is placed as a sub-species by Mr. Baker in his revision of the Liliums published in the "Journal of the Linnean Society."

L. Roezlei (Roezl's). *fl.* one to ten, corymbose or umbellate; perianth of a fine reddish-orange colour, 2in. to 3in. long; segments acuminate, about ½in. broad, yellow below, dotted with purple, reflexed. *l.* twenty to thirty, sometimes partly whorled, firm, glabrous, narrow-linear, acute; lower one 4in. to 5in. long, about ⅓in. broad. Stem 2ft. to 3ft. high, slender, glabrous. California, &c., 1871. (R. G. 667.)

L. roseum (rose-coloured).* *fl.* lilac, handsome, large, drooping, racemose; perianth between campanulate and infundibuliform; sepals free to their base, almost spathulate, with reflexed apices. April. *l.* crowded at the base of the stem, but alternate, sessile, linear, acuminate, grassy; the lower ones 1ft. to 1½ft. long, upper ones gradually passing into bracts. Stem 1½ft. high, erect, terete, glabrous. Gossain Than and Kumaon. See Fig. 426. (B. M. 4725; B. R. 1845, 1, under name of *L. Thomsonianum*.)

L. rubescens (reddish). A synonym of *L. Washingtonianum purpureum.*

FIG. 428. FLOWER-STEM OF LILIUM TESTACEUM.

L. sinicum (Chinese). A synonym of *L. concolor.*

L. speciosum (showy).* *fl.* pure white, or more or less suffused and copiously spotted with claret-red, 3in. to 5in. long, usually three to ten in a broad deltoid raceme; peduncles bracteate, rigid, erecto-patent. Summer. *l.* about twenty at the flowering time; lower ones ovate or ovate-lanceolate, 6in. to 9in. long, 1½in. to 2in. broad below the middle; upper ones lanceolate. Stem 1ft. to 3ft. high, rigid, erect, terete. Japan, 1832. A well-known and extensively cultivated species, varying considerably in the size and colouring of the flowers. It is most commonly known under the erroneous specific name of *L. lancifolium*, but the plant to which this name correctly belongs

Lilium—*continued.*

is *L. elegans.* (B. M. 3785; B. R. 2000; F. d. S. 276; P. M. B. v. 267.)

L. s. albiflorum (white-flowered).* A very desirable form, with pure white flowers.

L. s. punctatum (spotted).* A variety having the white perianth segments not suffused, but only spotted with red.

L. s. roseum (rose-coloured).* A handsome variety, with rose-tinted flowers. See Fig. 427.

FIG. 429. FLOWER-STEM OF LILIUM TIGRINUM.

L. spectabile (showy). A synonym of *L. dauricum.*

L. superbum (superb).* *fl.* orange-red, thickly spotted, from 3in. to 4in. long, often six to twelve, sometimes twenty to forty, disposed in a deltoid panicle 9in. to 12in. broad. July and August. *l.* often disposed in three or four or eight to ten-foliate whorls, few or much scattered, narrow-oblanceolate, acute, rather firm; lower ones 4in. to 5in. long, ½in. to ⅔in. broad. Stem 4ft. to 6ft. high, robust, upright, tinged with purple. Georgia, &c. (B. M. 936; F. d. S. 1014-15.)

L. s. carolinianum (Carolina). *fl.* like those of the type. *l.* much fewer, broader, and shorter, often five or six disposed in a whorl near the middle of the stem. Stem 1ft. to 2ft. high. Southern United States. SYNS. *L. autumnale* (L. B. C. 335), *L. carolinianum* (B. M. 2280; B. R. 580), and *L. Michauxianum.*

L. Szovitsianum (Szovits'). A synonym of *L. monadelphum Szovitsianum.*

L. tenuifolium (narrow-leaved).* *fl.* usually solitary, rarely two, drooping or sub-erect, bright scarlet, about 1½in. long. Summer. *l.* closely placed, much-ascending, thirty to fifty to a stem at the flowering time, linear-subulate, 1½in. to 2in. long, not more than a line broad. Stem 6in. to 12in. high, very slender. Siberia, 1820. An elegant species. SYNS. *L. linifolium* and *L. pumilum.*

L. testaceum (light brown). *fl.* yellow, tinged with dull red, 2½in. to 3in. deep, the lowest quarter connivent in a permanent cup; raceme rather regular, thyrsoid, usually from one to six, but sometimes twelve-flowered. End of July. *l.* always scattered, very

Lilium—*continued.*

close, sixty to a hundred to a stem at the flowering time, erecto-patent, linear. Stem reaching 5ft. to 6ft. in height, comparatively slender and wand-like, finely striated. 1841. SYNS. *L. excelsum* and *L. isabellinum.* A garden plant, probably a hybrid between *L. candidum* and *L. chalcedonicum.* See Fig. 428. (B. R. 1843, 11; F. d. S. i. 39; P. M. B. 1843, 221; R. G. 349.)

L. Thomsonianum (Thomson's). A synonym of *L. roseum.*

L. Thunbergianum (Thunberg's). A synonym of *L. elegans.*

L. T. aureum nigro-maculatum (yellow, black-spotted). A synonym of *L. elegans alutaceum.*

FIG. 430. INFLORESCENCE OF LILIUM TIGRINUM SPLENDENS.

L. tigrinum (tiger-spotted).* Common Tiger Lily. *fl.* bright deep orange-red, with numerous small, distinct, purplish-black spots 2½in. to 4in. long; racemes deltoid, eight to twenty-flowered, 8in. to 9in. broad; lateral peduncles rigidly erecto-patent. July and August. *l.* twenty to thirty at the time of flowering, linear, scattered irregularly, erecto-patent or spreading, dark glossy green. Stems 2ft. to 4ft. high, erect, firm, robust, purplish-black, pubescent. China, 1804. A well-known and very desirable species. See Fig. 429. (B. M. 1237.)

L. t. flore-pleno (double-flowered).* *fl.* bright orange-red, densely spotted with blackish-purple; perianth segments multiplied into about six series. Habit somewhat similar to *Fortunei.* Japan. (F. & P. 1871, 25.)

L. t. Fortunei (Fortune's).* This fine variety differs from the type in its greater stature, its larger pyramidal heads, and its more conspicuous cobwebby pubescence. Stems 6ft. to 7ft. high, the upper 2ft. and upwards forming a broad pyramidal panicle of flowers. China, 1850.

FIG. 431. FLOWER-STEM, IN TWO PARTS, AND DETACHED FLOWER OF LILIUM WASHINGTONIANUM.

L. t. splendens (splendid).* *fl.* sometimes twenty-five to a stem, of a bolder character than in *Fortunei*; spots fewer and larger. A fine variety. See Fig. 430. (F. d. S. 1931-2; F. & P. 1873, 15.)

Lilium—*continued.*

L. tubiflorum (tube-flowered). A synonym of *L. neilgherrense.*

L. Wallichianum (Wallich's). *fl.* white, greenish towards the base outside, fragrant, usually solitary, casually two or three; 7in. to 9in. long. Summer. *l.* fifty to sixty, always narrow-linear, ascending, the lower reaching 8in. to 9in. long. Stem 4ft. to 6ft. high, ½in. thick at the base. Sub-temperate Central Himalayas. Greenhouse. (B. M. 4561; F. d. S. 612; L. & P. F. G. 1850, 120.)

L. Wallichianum (Wallich's), of Wight. A synonym of *L. neilgherrense.*

L. Washingtonianum (Washington's).* *fl.* white, tinged with purple or lilac, all more or less cernuous when expanded, fragrant, 2½in. to 3½in. long, narrowed gradually from the neck to the base; racemes about 1ft. long on strong-growing specimens, and from 8in. to 9in. broad when fully expanded. Summer. *l.* in several distinct whorls, which are 3in. to 4in. apart in the lower part of the stem, and made up of about one dozen ascending oblanceolate leaves, which are 4in. to 5in. long. Stem 3ft. to 5ft. high, ⅝in. to ¾in. thick towards the base, stiff, erect, terete. California, 1872. See Fig. 431. (F. d. S. 1975-6; G. C. 1871, p. 709; R. G. 170.)

L. W. purpureum (purple). *fl.* purplish-black, spotted, umbellate. Stem 1ft. to 1½ft. high. California, 1873. SYN. *L. rubescens.* (F. d. S. 1975-6; R. G. 170.)

LILY BEETLE (*Crioceris merdigera*). In this beetle, the antennæ are borne on the front of the head, and the joints are short; the mandibles are short, and are provided with several teeth; the palpi are slender, and the elytra rather broad. The colour is bright scarlet during life, but fades rapidly after death. The larvæ live on Lilies, devouring the leaves. They form a protective coat by pushing their excrement upon their backs

FIG. 432. LILY BEETLE (CRIOCERIS MERDIGERA), showing Eggs, Larvæ (one naked, the other under its Coat), and Perfect Insect.

there to dry into a crust (see Fig. 432); they can free themselves at pleasure from this coat. They descend into the earth when the time arrives for them to become pupæ. Lily Beetles are very rare; but, when troublesome, the best plan to effect a clearance is to pick them off by hand and to throw them into hot water. White Hellebore has been found a quick and good method of getting rid of these insects. It should be applied as recommended for the **Gooseberry and Currant Sawfly** (which *see*).

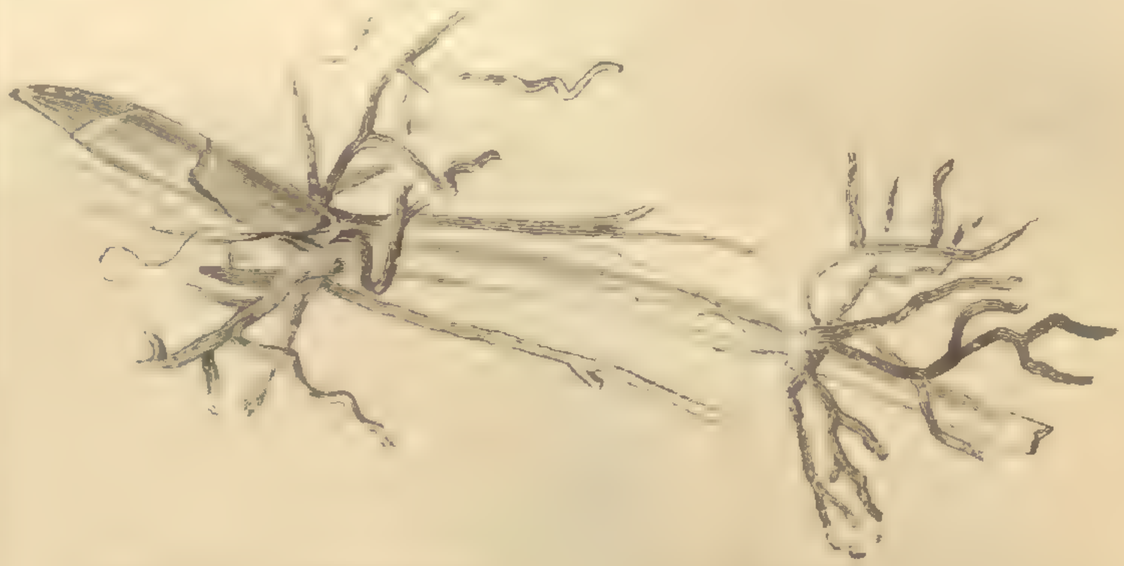

FIG. 433. YOUNG CROWN OF LILY OF THE VALLEY, FOR PROPAGATING.

LILY OF THE VALLEY (*Convallaria majalis*). The pure white, fragrant flowers, and pale green foliage of this beautiful native plant render it one of the most useful and universally admired. It succeeds outside in almost any situation, but prefers one with shade and plenty of moisture. When once planted and become established, the crowns keep increasing, and the larger ones flowering, each year without any attention, beyond the application of a top-dressing of manure or rich soil in the autumn. The plants are not particularly ornamental

Lily of the Valley—*continued.*

at any season except during spring and early summer; consequently, a place should be selected for their cultivation which is not too prominently exposed. In some parts of England, Lilies of the Valley are found, in any quantity, growing wild in woods; the shade and moisture there secured being suitable to their requirements. Where the plants are not found wild, they may readily be naturalised, if the position is not too dry, nor the herbage very thick. As grown outside, this plant is essentially a subject for supplying cut flowers, and these are always popular, and in great demand for bouquets of every description. Cultivated in pots, and forced into flower early in spring, the Lily of the Valley constitutes an invaluable subject for greenhouse and room decoration. The natural flowering season is April and May, according to the locality; by obtaining a plentiful supply of crowns, and forcing carefully, the season may commence inside early in December, and a succession of flowers be secured thenceforth until June. Lilies of the Valley may be propagated by seeds, which ripen freely if allowed, and should be sown in spring, outside. The usual method of propagation is by the numerous crowns which form at the points of creeping roots or underground stems (see Fig. 433). If clumps are allowed to grow undisturbed, the crowns become too thickly crowded, and do not produce such fine flowers as when more space is afforded.

Preparation of Crowns for Forcing. Size, and, consequently, good quality, in the flowers of the Lily of the

FIG. 434. FLOWERING STEM OF LILY OF THE VALLEY.

Valley (as represented in Fig. 434) depend entirely on the cultivation and attention given to the preparation of the crowns. Immense quantities of these are annually imported from Germany, to meet the demand for forcing purposes in this country. It is important to observe that those coming from Berlin are far better for early forcing than those received from Hamburg. The latter are generally much larger, but, for some reason, they cannot be depended upon to start well before January at the earliest. By adopting a system of annually preparing crowns for forcing, excellent ones, equal in every respect, if not superior, to those imported, may be obtained in this country. The following is a

Lily of the Valley—*continued.*

method which may be pursued: Select or prepare a piece of good ground in a border, with either an east or a west aspect. It should be manured and well trenched. The crowns should be lifted in autumn, or at any time before growth commences in spring, and placed together according to their sizes. In planting, a shallow trench should be cut out, the crowns placed upright in it, about 2in. apart, so that their points are just below the surface, and the soil filled in. Other trenches may then be prepared and planted in a similar way, leaving a space of about 9in. between them. Hoeing occasionally, to keep the surface open and clean, and watering in dry weather, until the leaves die away, will be all that is necessary afterwards. Crowns thus treated may be lifted for forcing the following winter, if required; but they are much stronger if allowed to remain until the second year. Young crowns being so freely produced, it is not usually difficult to obtain a supply from reserve clumps or borders where the ordinary system has been in practice. The sizes of crowns aged respectively one, two, and

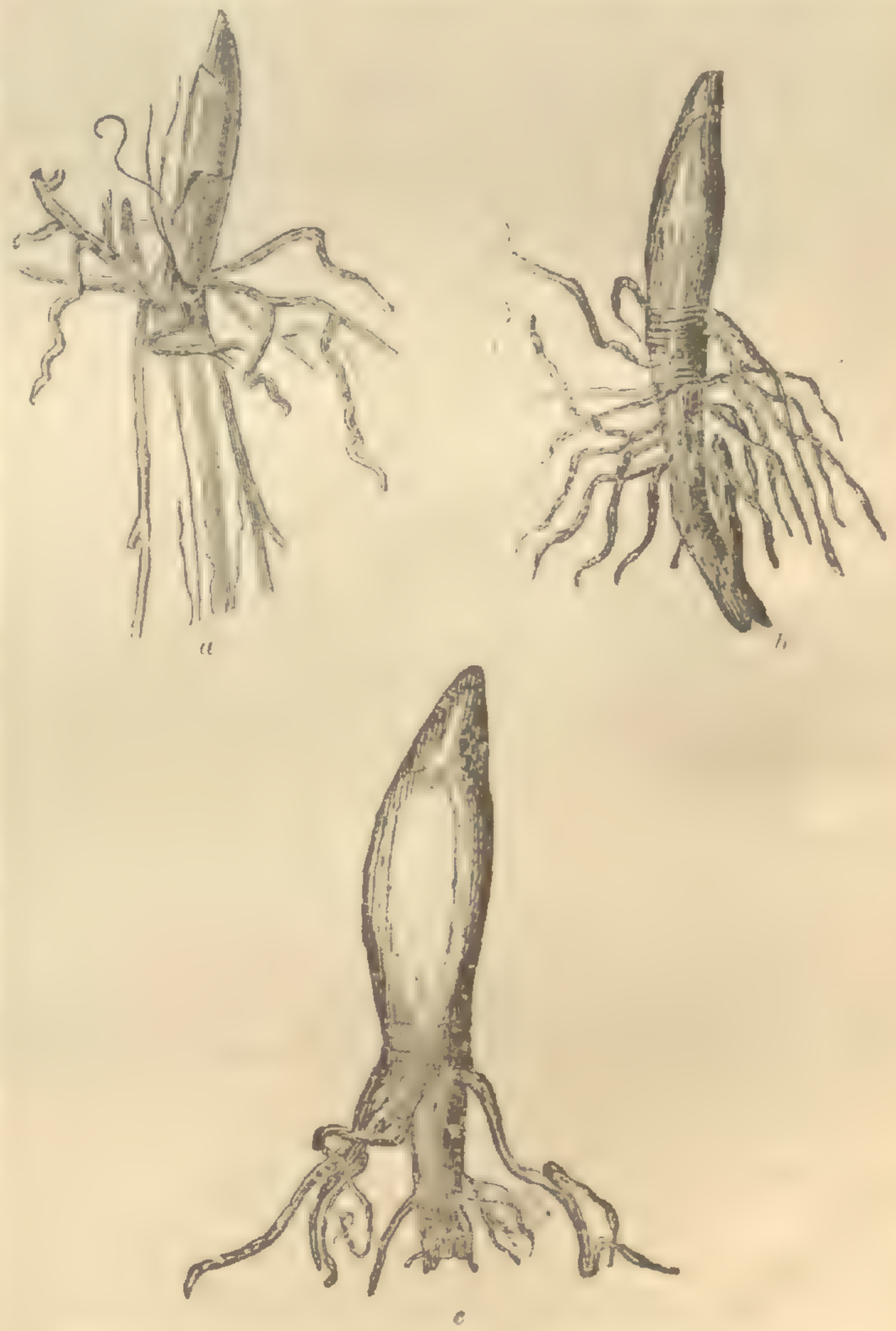

FIG. 435. CROWNS OF LILY OF THE VALLEY.

Preparation for Forcing.

a, One Year Old; *b*, Two Years Old; *c*, Three Years Old.

three years, are represented at *a*, *b*, and *c*, Fig. 435. The first, or small size, lifted at any time when at rest, in winter, will produce nothing beyond leaves the following year. From the second size, flowers of medium strength may be obtained. The large ones will be certain to flower, either indoors or outside, if placed under proper treatment. Clumps for forcing are prepared by planting a few crowns in a bunch, and allowing them to grow for two or three years previous to lifting. It will be seen that many of the crowns in such clumps cannot be of a

Lily of the Valley—*continued.*

similar age and size to those first planted, and, consequently, do not produce such large flowers.

Forcing. Either home-grown or imported Berlin crowns should be used for early forcing. They should be placed rather thickly in pots or boxes, and a little light soil or cocoa-nut fibre lightly shaken amongst the roots, but not over the tops; they should be covered with moss. Another plan is to insert them similarly in propagating frames, and pot up as they come into flower. The roots do not grow during this period; consequently, it is immaterial which method is adopted. Plunge in a bottom heat of about 85deg., and, if possible, maintain a surface temperature of 10deg. less. This encourages the production of leaves and flowers at the same time—conditions not readily obtained with the earlier supplies. If pots or boxes are used, empty ones of a similar size may be inverted over them, to keep the crowns in a darkened position. This is considered beneficial in assisting to start them into growth. When close frames are used, similar conditions may be secured by covering the sashes, so as to exclude light. It is important that the soil be placed as lightly as possible round the roots, in order that the heat may pass readily through it. Water, of the same temperature, should be given often enough to keep the whole well moistened. Bottom heat from an inclosed water tank, with pipes lying in it, is always more evenly distributed, and not of such a drying nature as when the pipes are amongst the plunging or draining material. The very earliest batch not unfrequently fails; but if the crowns are good, and proper attention is given in forcing, each of the later ones may generally be relied upon to produce good flowers. An excellent plan for obtaining leaves is to put in a few ordinary small crowns along with the larger ones. Clumps are forced in quantity later in the season; some of them, if well ripened, may be utilised at any season, where the purchasing or home cultivation of single crowns is impracticable. Lilies of the Valley, severely forced, are not of much further use; plants only gradually forwarded in spring, if put in the open ground after flowering, will recruit their strength again by the second year.

Varieties. Besides the typical plant so largely grown under the familiar name of Lily of the Valley, there are a few varieties, not, however, possessing any particular merit. A larger-growing form is known as *major*, and a rose-coloured variety is sometimes termed *rubra*. The variety with double flowers is not worth cultivating. There is a very ornamental form with golden-variegated leaves, which are attractive when the markings are well developed.

LILY THORN. *See* **Catesbæa.**

LIMATODES. Included under **Phaius** (which *see*).

LIMAX. *See* **Slugs.**

LIMB. The flat expanded part of a petal.

LIME. The application of Lime as a manure to certain soils has long been practised, and has been attended with excellent results, in rendering them productive, and bringing, by its chemical action, the component parts into a proper condition for being absorbed by the roots of plants. Lime is not naturally found in a free state, but is plentiful in combination with carbonic acid, forming what is termed Carbonate of Lime. In the process of burning usually adopted, the carbonic acid is driven off, and the substance left (Quicklime) has a powerful affinity for water, either for absorbing it rapidly when placed in contact, or more slowly from the atmosphere. Quicklime is extremely caustic, and possesses the power of decomposing animal and vegetable substances; hence its fertilising value on soils containing a large quantity of inert vegetable matter, such as recently broken-up grass land, or that where there is a quantity of peat, consisting of roots and fibres, that would otherwise long remain in an undecomposed state.

Lime—*continued.*

Lindley, in his "Theory of Horticulture," states that "when this substance (Lime) is mixed with decaying matter, it hastens its decomposition, and renders it more easily assimilable by plants. This is its chief horticultural value, if regarded as a manure. In old cultivated land, rich in humus, it suddenly increases productiveness in a remarkable degree; increasing the properties of dormant animal or vegetable manure. Hence it has a most important effect in kitchen gardens. But Limed land soon loses its productiveness unless manure is subsequently applied, and poor soils are soon run out by it. To some plants, such as many Conifers, it is injurious; to others it appears to be an indispensable article of food, such as Potatoes, Sainfoin, Barley, Beetroot, Peas, Clover, &c." Although Lime itself is thus apparently a necessary element in the food of many plants, it is more especially valuable in soils by rendering other constituents soluble, and reducing them to a state in which they may be absorbed and assimilated. In applying Lime to any land, some caution is necessary, as it possesses the important property of expelling or setting free ammonia, one of the indispensable constituents of plant-food. Where farmyard manure has long been used, a light application of Lime may be of great advantage in hastening decomposition; while, on the other hand, soils which contain but a small amount of organic or vegetable matter, might, by similar dressings, become exhausted. Peat and clay soils, or those recently broken up after forming grass-land, are acted upon most beneficially by Lime, the effect produced depending greatly on the amount of organic matter contained in each. It should be applied as a top-dressing, or be well incorporated near the surface of the soil. One of the best methods is to form a compost of spare earth, weeds, or organic refuse of any description, for spreading over the ground, and mix a large proportion of Lime with it. The latter substance contributes its own fertilising effects to the mixture, and, at the same time, exerts its influence in many other ways. The application of Lime has been recommended, in some cases, to the extent of 200 bushels to an acre; but a quarter or half of this quantity will, perhaps, in the majority of instances, be sufficient to effect the desired purpose. An experiment should be made with a small portion of ground, in the first place, and, if the results prove favourable and marked, a larger portion might be treated under similar or altered conditions, according to the amount of success attained. The presence of Lime in the soil is very hurtful to Rhododendrons, and many other hard-wooded plants of a like nature, grown in the open air. It is also most destructive to hard-wooded Cape and Australian plants, cultivated in sandy-peat soil, under glass. Lime being, to a certain extent, soluble in water, the use of that which contains any large proportion should, if possible, be avoided in the cultivation of all the plants just referred to. Rain-water contains much less than any other; consequently, it should be preserved and utilised to the fullest extent in preference to that obtained from wells, springs, or other sources.

LIME, CHLORIDE OF. *See* **Chloride of Lime.**

LIME, SWEET. *See* **Citrus Limetta.**

LIME-TREE. *See* **Tilia.**

LIME, WEST INDIAN. *See* **Citrus medica acida.**

LIMNANTHEÆ. A tribe of *Geraniaceæ.*

LIMNANTHEMUM (from *limne*, a marsh or pool, and *anthemon*, a blossom; referring to the natural habitat of the species). Floating Heart. SYNS. *Schweyckertia*, *Waldschmidia*. ORD. *Gentianeæ*. About two dozen species have been referred to this genus; these may probably be reduced to about ten. They are ornamental aquatic plants, closely allied to *Villarsia*, widely dis-

Limnanthemum—*continued.*

persed over the temperate and warmer regions of the globe, seven being natives of Australia. Flowers yellow or white; peduncles one-flowered, either in the tufts of leaves, or two together, or clustered at the nodes of the weak stems, or close to an almost terminal sessile leaf; corolla sub-rotate, the lobes five, entire or fringed. Capsule indehiscent or bursting irregularly when ripe. Leaves ovate or orbiculate, deeply cordate, entire or obscurely sinuate. For culture, *see* **Villarsia.**

L. indicum (Indian). *fl.*, corolla yellow, the margins fringed. *l.* orbicular or broadly oval, deeply cordate, usually entire, with a close or open sinus, coriaceous, palmately veined and reticulate, but the veins not prominent. North Australia. SYN. *Menyanthes indica* (under which name it is figured in B. M. 658). *L. Ecklonianum*, *L. Forbesianum*, *L. Humboldtianum*, *L. orbiculatum*, and *L. Thunbergianum*, are probably forms of this species.

L. nymphæoides (Nymphæa-like).* *fl.*, corolla yellow; segments ciliated; umbels sessile, terminal, or in the forks of the stems. Summer. *l.* opposite, cordate-orbicular or orbicularly reniform, repand. Britain. A very beautiful hardy aquatic, but somewhat difficult to eradicate when once established. SYN. *Villarsia nymphæoides.* (Sy. En. B. 921.)

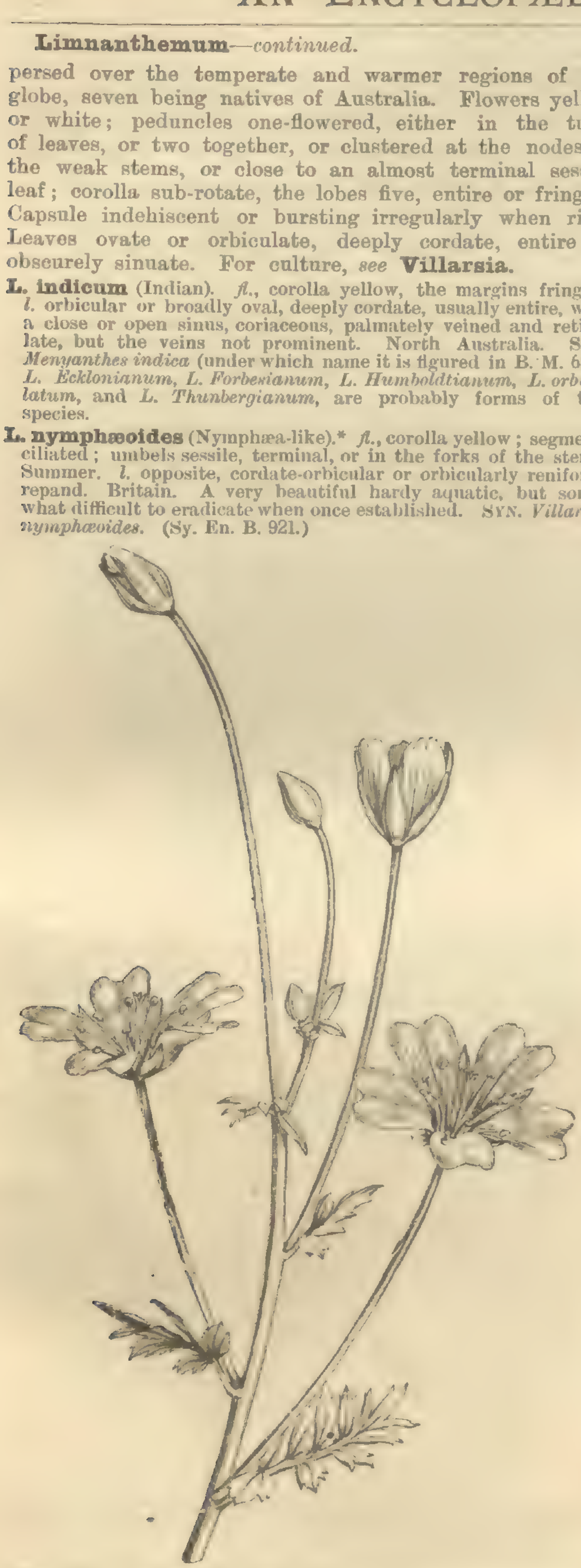

FIG 436. FLOWERING BRANCH OF LIMNANTHES DOUGLASII.

LIMNANTHES (from *limne*, a marsh, and *anthos*, a flower; in reference to the habitat of the plants). ORD. *Geraniaceæ.* A small genus (two species) of diffuse, glabrous, hardy annuals, natives of California. Flowers white, yellowish, or pink, regular; peduncles axillary, one-flowered; petals five, sub-perigynous, contorted; sepals five, valvate. Leaves alternate, cut, exstipulate. The undermentioned species is well adapted for beds,

Limnanthes – *continued.*

edgings, rockeries, &c. Propagated freely by sowing seeds in any ordinary garden soil, in March, for summer, and in September, for spring, flowering.

L. Douglasii (Douglas's).* *fl.* yellow, passing off to white streaked with grey, sweet-scented. Spring to autumn. *l.* pinnate, with an odd or terminal three-cleft leaflet. *h.* 8in. 1833. A very showy annual, with a spreading habit and prostrate stems. See Fig. 436. (B. M. 3554; B. R. 1673.) Two or three varieties, differing slightly from the type in colour and size of flower, are mentioned in seed catalogues.

LIMNOCHARIS (from *limne*, a marsh, and *charis*, grace, beauty; alluding to the habitat and appearance of the plants). ORD. *Alismaceæ.* A genus consisting of three or four species of stove, greenhouse or half-hardy herbaceous perennial aquatics, natives of tropical America. Flowers yellow, on long stalks. Leaves fasciculate, swimming, ovate or cordate-orbicular. *L. Plumieri*, the only species in cultivation, is a handsome stove or greenhouse aquatic. It should be grown in tubs or cisterns, or in the shallow part of an aquarium. Propagation may be effected by divisions, by runners, or by seeds.

L. Plumieri (Plumier's).* *fl.* yellow, six to ten in an umbel; scape and peduncles three-sided, the former purple, green at top, the latter with reddish angles. June to November. *l.* oblong, very blunt at each end; petiole three-sided, sheathing at base, purple below, green above. *h.* 1½ft. Brazil, 1822. (B. M. 2525.)

LIMODORUM TUBEROSUM. *See* **Calopogon pulchellus.**

LIMONIA (from *Limuna*, the Persian name of the Citron). ORD. *Rutaceæ.* This genus comprises two or three species of small trees or shrubs, often spiny, natives of tropical Asia. Flowers fasciculate or racemose. Berry globose. Leaves alternate, trifoliolate or impari-pinnate; leaflets opposite, entire or crenate; petioles winged. The species thrive in a compost of peat, loam, and dried cow-dung, with a few small pieces of charcoal added. Propagated by cuttings, made in spring or summer, and placed in sandy soil, under a glass, in very gentle bottom heat; or by seeds, sown on a hotbed, during spring.

L. acidissima (very acid). *fl.* white, fragrant, in sub-umbellate racemes. *fr.* yellowish, afterwards changing to reddish or purplish. *l.* pinnate, with winged stalks. India. *h.* 8ft. to 10ft. A spiny shrub or small tree. The Javanese employ the acid, flesh-coloured pulp of the fruits of this species as a substitute for soap.

LIMONIASTRUM (from *leimon*, a meadow, and *aster*, a star; in allusion to the starry flowers, and the habitat of the plants). SYN. *Bubania.* ORD. *Plumbagineæ.* A genus comprising only a couple of species of greenhouse or nearly hardy small shrubs or sub-shrubs, natives of the Western Mediterranean region. Calyx tubular; corolla blue, funnel-shaped, with a five-lobed, spreading limb; scapes or peduncles dichotomously branched. Leaves crowded on the stem or alternate on the branches, narrow, entire. The undermentioned plants are nearly hardy shrubs. For culture, *see* **Statice** (with which the species are sometimes confused).

L. monopetala (one-petaled). *fl.* solitary, borne in scaly paniculate spikes; corolla salver-shaped, with a very long curved tube; calyx scarcely enlarging after flowering. July to September. *l.* linear-spathulate, sheathed at base. Stem leafy. *h.* 3ft. Sicily, 1731. All the green parts of the plant are covered with white disks of calcareous matter. SYN. *Statice monopetala* (under which name it is figured in B. R. 1841, 54).

L. m. denudata (naked). A well-marked variety, differing from the type in having paler and smaller flowers, a more drawn-up habit, broader leaves, which are somewhat wavy at the edge, and a much smaller quantity of calcareous matter. SYN. *Statice monopetala denudata* (under which name it is figured in B. R. 1842, 59).

LINARIA (from *Linon*, Flax; referring to the resemblance in the leaves). Toadflax. ORD. *Scrophularineæ.* A large genus (about 150 species) of usually hardy herbs, rarely sub-shrubs, broadly dispersed through the extra-tropical Old World regions of the Northern hemisphere, one being found in extra-tropical North and South

Linaria—*continued.*

America. Flowers spicate or racemose, or solitary and axillary; corolla tube furnished with a spur at the base; palate more or less bearded, usually prominent at the throat, but sometimes depressed, and not closing the throat; upper lip erect, lower one trilobate. Leaves opposite or whorled, the uppermost often alternate. All the species of this genus are of easy culture in any moderately good, well-drained soil; the dwarfer plants are admirably adapted for the rock-garden, and for margins of borders. Propagated freely by divisions, in spring or autumn; or by seeds, sown on a light soil, during March or April.

L. æquitriloba (equally three-lobed). *fl.* purple; floriferous pedicels nearly as long as the leaves; calyx segments linear-lanceolate. June. *l.* mostly opposite, small, cordate-reniform, three (rarely five) lobed; lobes short, round, very shortly mucronate. Sardinia, &c., 1829. A small evergreen. (B. M. 2941.)

L. alpina (alpine).* *fl.* bluish-violet, with a rich golden centre, disposed in sub-capitate racemes; spur equal in length to the corolla, sometimes straight, and sometimes incurved, acute. Summer and autumn. *l.* linear or linear-lanceolate, thickish, four in a whorl. *h.* 6in. Alps of Europe. An exceedingly pretty little herbaceous perennial, forming dense compact tufts; it is one of the best for growing on rockwork. (F. d. S. 2128.)

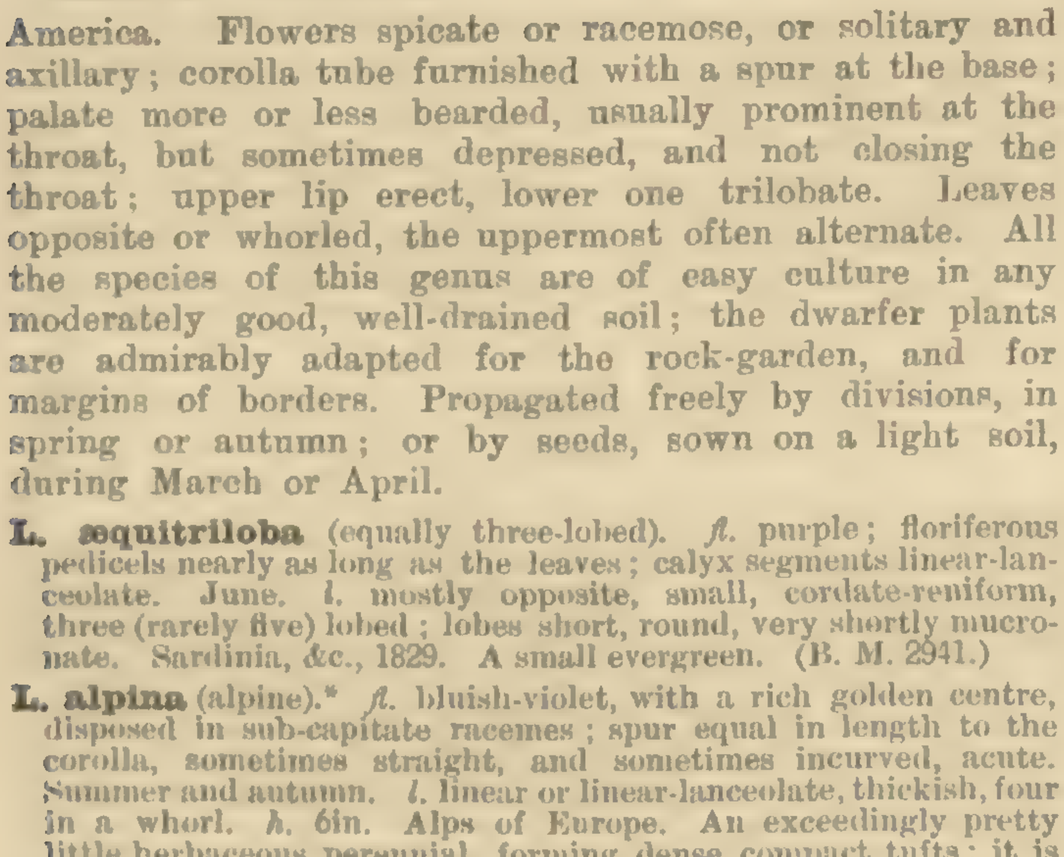

FIG. 437. LINARIA BIPARTITA, showing Habit, and (1) Front View of Flower, (2) Side View, (3) Corolla laid open, (4) Calyx, (5) Style and Ovary, and (6) Stamen.

L. bipartita (twice-parted).* *fl.* violet-purple, disposed in loose racemes; palate orange-coloured, whitish at the base; spur arched, scarcely exceeding the corolla. June to September. *l.* linear or linear-lanceolate, flat, alternate or verticillate. *h.* 1ft. Portugal, 1815. Annual. See Fig. 437. (S. B. F. G. 30.)

L. canadensis (Canadian). *fl.* violet, loosely racemose; pedicels erect, not longer than the curved corolla spur; calyx segments oblong-lanceolate, acute, shorter than the corolla tube. July. *l.* remote, linear. *h.* 6in. to 2ft. North America, 1812. Annual. (B. M. 5473.)

L. crassifolia (thick-leaved).* *fl.* pale but bright blue-purple, with a yellow palate and red-purple throat, large. *l.* ovate, acutish, glabrous, thickish. *h.* 3in. to 6in. South-west Europe. (B. M. 5733, under name of *L. origanifolia crassifolia*.)

L. Cymbalaria (Cymbalaria).* Mother of Thousands. *fl.* pale blue or lilac, small, with short spurs, which are a little recurved. Spring to late autumn. *l.* mostly alternate, cordately-reniform, five to seven-lobed; lobes rounded or cuneiform, mucronulate. Branches prostrate, creeping, and rooting. Roots rhizomatous, emitting fibres. Europe (Britain). A very pretty and well-known perennial climber, of which there are two desirable varieties; one with pure white flowers, and another with variegated leaves. (Sy. En. B. 955.)

L. dalmatica (Dalmatian).* *fl.* yellow, large, few, and loose, at the summits of the branches; spur straight, much shorter than the corolla. Summer. *l.* oblong-lanceolate or linear-lanceolate, acute. Branches erect or decumbent, densely clothed with leaves. *h.* 3ft. to 4ft. South-eastern Europe, &c., 1731. A handsome and vigorous-growing perennial. (B. R. 1683.)

L. genistæfolia (Genista-leaved). *fl.* pale yellow, paniculately racemose; spur rather straight, equal in length to the corolla. Summer and autumn. *l.* lanceolate, acute, three to five-nerved, somewhat stem-clasping. Stem branched. *h.* 2ft. to 4ft. Europe, Asia Minor, 1704. Perennial. (B. M. 2183.)

Linaria—*continued.*

L. hepaticæfolia (Hepatica-leaved).* *fl.* lilac-purple, with the pedicels longer than the leaves; calyx segments linear-acute; spur shorter than the tube. Summer. *l.* cordate-reniform, three to five-lobed, glabrous. Corsica. A very pretty floriferous perennial, 1in. to 2in. high; it forms a neat dense carpet for rockwork, &c.

L. heterophylla (variable-leaved). *fl.*, corolla pale straw-colour, 1in. long; calyx longer than the pedicel; racemes usually branched at base. July. *l.* scattered, spreading, 1in. to 2in. long, narrow-linear or acicular, obtuse, rarely narrowly elliptic-lanceolate, rather fleshy, one-nerved. *h.* 2ft. to 3ft. Marocco, 1871. Annual. (B. M. 6041.)

L. macroura (long-tailed).* *fl.* yellow, with a more intense-coloured villous palate, large, disposed in long, straight, dense racemes; spur straight, length of corolla or a little longer. Summer and autumn. *l.* linear, flat, glaucous. *h.* 1ft. to 1½ft. Orient, 1822. Plant erect, branched or simple.

FIG. 438. LINARIA MARITIMA.

L. maritima (maritime). *fl.* pale yellow, with an orange palate; spur as long as corolla. Summer. *l.* linear, scattered or sometimes whorled, glaucous, glabrous. *h.* 6in. to 12in. South-west Europe. Annual. See Fig. 438.

FIG. 439. LINARIA MAROCCANA, showing Upper Portion of Plant and detached Flower, Calyx, and portion of Stem with Glandular Hairs.

L. maroccana (Marocco). *fl.* bright violet-purple, disposed in long racemes. June. *l.* linear, those of the primary shoots whorled. *h.* 9in. Marocco, 1872. Annual. See Fig. 439. (B. M. 5983.)

L. origanifolia (Origanum-leaved). *fl.* bluish-violet, with a yellow throat, alternate, distant, forming a loose raceme. Summer and autumn. *l.* oblong or obovate, on short petioles; lower ones opposite, upper ones alternate. South-west Europe, 1785. Plant ascending, annual.

L. o. crassifolia (thick-leaved). A synonym of *L. crassifolia*.

L. purpurea (purple).* *fl.* bluish-purple, mouth of corolla bearded with white hairs along the edges, tube striped with purple, dis-

Linaria—*continued.*

posed in loose elongated racemes; spur arched, length of corolla. July to September. *l.* linear or linear-lanceolate; lower ones four to nine in a whorl, upper ones three in a whorl. *h.* 1ft. to 3ft. South Europe, 1648 (naturalised in Britain). Plant glabrous, branched, erect. A good perennial for growing on old walls, &c. (B. M. 99; Sy. En. B. 960.)

FIG. 440. PORTION OF INFLORESCENCE, DETACHED FLOWER AND LEAF, OF LINARIA TRIORNITHOPHORA.

L. reticulata (reticulated).* *fl.* deep purple, reticulately veined; palate copper-coloured or yellow, marked with deep purple lines; spur shorter than the corolla; raceme crowded, short, downy, tapering upwards. May to July. *l.* linear, channelled; lower ones verticillate, upper ones scattered. *h.* 2ft. to 4ft. Portugal, 1788. Annual. (B. H. ii. 48.) The variety known as *aurea purpurea* is a very distinct and pretty novelty, with deep rich purple and orange flowers.

FIG. 441. LINARIA VULGARIS PELORIA, showing Habit and detached Single Flower.

L. sagittata (arrow-shape-leaved). *fl.* yellow, axillary, solitary, on capillary pedicels often exceeding the leaves; sepals lanceolate, acute; corolla 1½in. long, lips very broad. June. *l.* scattered, distant, petioled, 1in. to 1½in. long, lanceolate-oblong or linear, with a hastate base, quite entire. Stems very slender, 6ft. to 10ft. long. Marocco, 1871. Perennial. (B. M. 6060.)

L. saxatilis (rock). *fl.* yellow, palate usually marked with two fulvous spots or lines, disposed in sub-capitate heads; spur short, acute. August. *l.* thickish; lower ones four in a whorl, almost lanceolate; upper ones alternate, linear-lanceolate. Spain, 1819. Plant clothed with clammy down, procumbent. A pretty trailing perennial.

L. spartea (Spartium-like).* *fl.* deep yellow, on long pedicels; spur straight; raceme few-flowered, glabrous, or clothed with short clammy down. Summer and autumn. *l.* linear-lanceolate, erect; lower ones often three in a whorl, upper ones alternate. Spain, &c., 1772. A pretty, upright, branched annual.

L. triornithophora (three-birds-bearing).* *fl.* purple, with a yellow palate, 1in. long, usually three or four in a whorl; tube inflated and striated. June to September. *l.* lanceolate, acute, quite glabrous. Branches erect, decumbent at top. Portugal and Spain, 1710. A desirable and pretty perennial. See Fig. 440. (F. d. S. 2297.)

L. tristis (sad). *fl.* yellow, with a dark purple or brown mouth, approximate, sometimes nearly opposite; spur thick, striated, arched at the base, about equal in length to the corolla. July and August. *l.* linear or linear-oblong; lower ones three or four in a whorl, upper ones opposite or alternate. Portugal and Spain, 1722. A very pretty decumbent annual. (B. M. 5827.)

L. vulgaris (common). Common Toadflax. *fl.* pale yellow or citron, disposed in dense spicate racemes; palate copper-coloured; spur curved, about equal in length to the corolla. Spring to autumn. *l.* linear or linear-lanceolate. *h.* 2ft. to 3ft. Europe (Britain), North Asia. A handsome and erect native perennial. (Sy. En. B. 962.) The variety *Peloria*, instead of having one spur, has five; the corolla has become regular through excess of irregularity—a condition more frequently met with in *L. vulgare* than in any other species; it is constant under cultivation, but is rare in the wild state. See Fig. 441.

LINCONIA (said to be a South African name). ORD. *Bruniaceæ*. A genus comprising three species of ornamental, Epacris-like, greenhouse evergreen sub-shrubs, natives of the Cape of Good Hope. Flowers white, solitary, in the axils of the upper leaves; calyx adnate to the ovary; petals lanceolate, not clawed, coriaceous, convolute. Leaves spirally arranged. Branches numerous, erect. For culture, *see* **Diosma.**

L. alopecuroides (fox-tail-like). *fl.* white or flesh-coloured, a little longer than the leaves. May. *l.* spreading a little, linear, acute, almost sessile. *h.* 2ft. 1816.

L. cuspidata (cuspidate-leaved). *fl.* white; bracts equal in length to the calyx, with fringed pilose edges. May and June. *l.* spreading a little, oblong, obtuse, ustulate at the apex, keeled. *h.* 2ft. 1825.

L. thymifolia (Thyme-leaved). *fl.* white. May and June. *l.* ovate-oblong, obtuse, keeled, tipped with black. *h.* 2ft. 1825.

LINDELOFIA (named in honour of Friedrich von Lindelof, of Darmstadt, a patron of botany). SYN. *Anchusopsis.* ORD. *Boragineæ.* A monotypic genus, the

FIG. 442. LINDELOFIA SPECTABILIS, showing Habit and detached Flowers.

species being an erect, scabrous-pubescent or slightly villous, hardy perennial herb. It thrives in any good

Lindelofia—*continued.*

garden soil. Propagation may be effected either by seeds or by division of the roots. The former method is the most productive, but the plants thus raised will **not flower until the second season after sowing.**

L. spectabilis (showy). *fl.* purple, red; calyx segments twice as short as the corolla tube; racemes ebracteate. May to August. *l.* oblong, acuminate; upper ones cordate-amplexicaul at base. *h.* 1ft. to 1½ft. India, 1839. See Fig. 442. (B. R. 1840, 50, under name of *Cynoglossum longiflorum*.)

LINDENIA (named after J. Linden, a Belgian horticulturist). ORD. *Rubiaceæ*. A genus comprising three species of glabrous or pubescent shrubs, of which two are natives of Mexico and Central America, and the third inhabits the islands of New Caledonia and Fiji. Flowers white, showy, in short terminal cymes, pedicellate. Leaves opposite, shortly petiolate, linear-lanceolate; stipules intrapetiolar. *L. rivalis*, the only species yet in cultivation, is a handsome stove evergreen shrub, remarkable in having a corolla tube 5in. long. It thrives in a loam and peat soil. Propagated by ripened cuttings, inserted in sand, under a bell glass, in heat

L. rivalis (brook loving).* *fl.* white, with a red tube; corolla of five oblong lobes 1in. long; corymbs small, few-flowered. August. *l.* lanceolate, 2in. to 3in. long, clustered towards the ends of the shoots. *h.* 3ft. Mexico, &c., 1856. (B. M. 5258; G. C. n. s., xvi. 130.)

LINDEN-TREE. *See* **Tilia.**

LINDERA (named after John Linder, a Swedish botanist of the early part of the eighteenth century). Including *Benzoin*. ORD. *Laurineæ*. A rather large genus (about fifty species) of trees and shrubs, natives of tropical and Eastern Asia (extending to Japan), and North America. Flowers dioecious, umbellate or capitate; perianth segments six, petaloid and often small; tube very short; involucre sessile or pedicellate. Berry globose or ovoid. Leaves alternate or almost opposite, penniveined or three to five-nerved, coriaceous and perennial, or slender and annual. For culture of the undermentioned hardy species—probably the only ones grown in gardens—see **Laurus.**

L. Benzoin (Benzoin). Benjamin Bush; Spice Bush. *fl.* honey-yellow, in almost sessile, lateral, umbel like clusters, appearing before the leaves, the clusters composed of smaller clusters or umbels, each of four to six flowers. March and April. *l.* oblong-obovate, pale beneath. *h.* 6ft. to 12ft. North America, 1683. SYN. *Laurus Benzoin.*

L. melissæfolia (Melissa leaved). Jove's Fruit. *fl.* similar to those of *L. Benzoin*; umbels few. April. *l.* oblong, obtuse, or cordate at base, downy beneath. Young branches and buds pubescent. *h.* 6ft. North America, 1810. SYNS. *Laurus Diospyrus* (B. M. 1470), *Laurus melissæfolia.*

LINDHEIMERA (named in honour of Ferdinand Lindheimer, the discoverer of the plant). ORD. *Compositæ*. A monotypic genus, the species being an erect, scabrous-hirsute, branched, greenhouse or half-hardy annual herb, requiring similar culture to **Zinnia** (which *see*).

L. texana (Texan).* *fl.-heads* yellow, disposed in an irregular leafy corymb; achenes scabrous-tuberculate or slightly hispid; involucral scales in two rows; receptacle flat. August and September. *l.* alternate, oblong, thickly toothed. *h.* 1ft. to 2ft. Texas.

LINDLEYA (named after John Lindley, 1799-1865, a celebrated English botanist). ORD. *Rosaceæ*. A monotypic genus. The species is a half-hardy, evergreen, much-branched glabrous tree, with the habit of *Pyrus Malus*. It has follicular or capsular fruits and winged seeds, and has its five ovaries consolidated. It thrives in a well-drained loam, and would probably do best in a chalky soil. Propagated by ripened cuttings, placed under a glass, in bottom heat, or by grafting on the Hawthorn.

L. mespiloides (Mespilus like).* *fl.* white, sweet scented, hermaphrodite, bracteate, axillary or at the tips of the branchlets, solitary; calyx persistent; petals orbiculate, large; peduncles bibracteolate. July. *l.* coriaceous, scattered, simple, crenulated, petiolate. *h.* 20ft. to 30ft. Mexico, 1843. (B. R. 1844, 27.)

LINDLEYA (of Nees). A synonym of **Laplacea** (which *see*).

LINDSÆA. A synonym of **Lindsaya** (which *see*).

LINDSAYA (named after Archibald Lindsay, an English botanist of the last century). SYN. *Lindsæa*. Including *Diellia*, *Isoloma* (of J. Smith), *Schizoloma*, *Synaphlebium*. ORD. *Filices*. A genus comprising about fifty species of very handsome stove or greenhouse ferns, mainly confined within the tropics. Sori marginal or sub-marginal, placed at the apex of and uniting two or more veins; involucre double, opening outwardly, the inner valve membranaceous, the outer formed of the more or less changed margin of the frond. The species are, for the most part, extremely difficult to cultivate for any length of time; and the best plan is to grow them in well-drained pots of fibrous loam and sand, under the same conditions, as regards atmospheric moisture, &c., as those which are found most suitable for Filmy Ferns. Except where otherwise indicated, the species described below require stove treatment. *See also* **Ferns.**

L. adiantoides (Adiantum-like).* *sti.* nearly tufted, black, polished, wiry, 1in. to 2in. long. *fronds* 4in. to 6in. long, about 1in. broad, simply pinnate; pinnæ ¾in. long, about ⅛in. deep, the upper imbricated, lower edge straight or slightly curved, upper rounded and broadly lobed about one-third the way down. *sori* marginal in the lobes. Malay Archipelago, &c., 1840. (H. S. F. i. 61c.)

L. concinna (neat). *rhiz.* short-creeping. *sti.* 2in. to 4in. long, wiry, erect. *fronds* 6in. to 12in. long, ¾in. broad, simply pinnate; pinnæ four lines long, two lines deep, very blunt on the outer edge, the upper edge very slightly crenate, upper ones close together but scarcely imbricated. *sori* in a continuous or slightly interrupted line along the upper edge. Philippine Islands and Borneo, 1842. This species is closely allied to *L. cultrata.* (H. S. F. i. 61B.)

L. cultrata (knife-shaped).* *sti.* wiry, flexuose, 3in. to 6in. long. *fronds* 6in. to 12in. long, about 1in. broad, simply pinnate; largest pinnæ ⅛in. to ¼in. deep, not imbricated, the lower margin straight or slightly curved, usually upwards, the upper edge slightly lobed, so that the continuity of the line of fructification is broken, sometimes nearly entire. North of India. An elegant little species, yielding a fragrance similar to the Sweet scented Vernal-grass (*Anthoxanthum odoratum*). (H. S. F. i. 62c, under name of *L. Lobbiana*).

L. divergens (wide-spreading). *rhiz.* creeping, wiry, fibrillose. *sti.* wiry, erect, 4in. to 6in. long, 1½in. to 2in. broad, simply pinnate; pinnæ ⅜in. to 1in. long, two to three lines broad, obliquely truncate at the base below, auricled at the base above, margin entire, point bluntish. *sori* in a continuous line along both edges. Malayan Peninsula. SYN. *Isoloma divergens.*

L. dubia (doubtful). *rhiz.* short creeping. *sti.* close together, wiry, 3in. to 6in. long. *fronds* 4in. to 8in. long, 1½in. to 2in. broad, simply pinnate; pinnæ 1in. long, not more than ¼in. broad; upper edge crenated towards the gradually-narrowing point, even the upper ones with usually ⅛in. to ¼in. between them, often not truly dimidiate, but with the costa becoming central towards the point. Line of the sori not interrupted till it reaches the crenations of the outer third of the upper margin. Venezuela, Guiana, &c. (H. S. F. i. 64c.)

L. elegans (elegant). A synonym of *L. stricta.*

L. ensifolia (sword-fronded). *rhiz.* creeping, stout, paleaceous. *sti.* 6in. to 9in. long, wiry, flexuose. *fronds* 6in. to 12in. long, 3in. to 4in. broad, with a linear-lanceolate, simple or pinnatifid point, simply pinnate below; pinnæ usually in numerous pairs, all stalked, 1in. to 6in. long, ⅛in. to 1in. broad, linear acuminate to lanceolate, sterile ones a little toothed. *sori* in a continuous marginal line. Hong Kong, Himalayas, &c. SYN. *Schizoloma ensifolia.* (H. G. F. 62.)

L. falcata (sickle-shaped). *sti.* 3in. to 4in. long, strong, erect, densely paleaceous. *fronds* 1ft. to 1½ft. long, 2in. to 4in. broad, lanceolate, simply pinnate; pinnæ 1in. to 2in. long, ⅛in. to ¼in. broad, linear-lanceolate, falcate, acuminate, slightly undulated at the margin, the upper half rather broader and auricled at the base, the lower ones very short and blunt. *sori* marginal, transversely oblong. Sandwich Islands. SYN. *Diellia falcata.*

L. flabellulata (fan-shaped). *rhiz.* short creeping. *sti.* wiry, erect, brownish-black, polished. *fronds* 6in. to 12in. long, simple or with one or several pairs of lateral branches; pinnules ¼in. to ⅜in. long, about ⅛in. deep, the lower line nearly straight or decurved, the upper rounded, entire or lobed, point broadly rounded; venation flabellate. *sori* in a continous line, except when interrupted by the lobes. India, China, to North Australia. (H. S. F. i. 63.) *L. tenera* differs from this species only in its thinner texture.

L. guianensis (Guiana).* *rhiz.* short creeping. *sti.* 6in. to 12in. long, rigid, erect. *fronds* 1ft. to 2ft. long, with an entire point and one to six pairs of lateral erecto-patent branches, 6in. to 9in. long, which are sometimes again branched; pinnules ⅛in. long, ⅛in. broad, not lobed, and the outer edge bluntly rounded, closely packed and sometimes imbricated. *sori* in a continuous line.

Lindsaya—*continued.*

Tropical America, 1845. A beautiful species, closely allied to *L. trapeziformis.* (H. S. F. i. 62A.)

L. heterophylla (variable-leaved). *rhiz.* short-creeping. *sti.* 4in. to 8in. long, firm, naked, erect. *fronds* 6in. to 12in. long, 3in. to 6in. broad, lanceolate or oblong-deltoid, varying from simply pinnate, with large, linear-lanceolate, entire pinnæ, to bipinnate, with erecto-patent branches, 3in. to 4in. long, with oblong-lanceolate blunt pinnules, ½in. to 1in. long, ¼in. broad. *sori* in continuous marginal lines. Neilgherries to Malaya. SYN. *Schizoloma heterophyllum.*

L. horizontalis (horizontal). A synonym of *L. trapeziformis.*

L. lanuginosa (woolly). *rhiz.* stout, creeping, clothed with fibrillose scales. *sti.* stout, erect, 4in. to 6in. long. *fronds* 1ft. to 2ft. long, 3in. to 4in. broad, simply pinnate; pinnæ 1½in. to 2in. long, ¼in. to ½in. broad, linear, entire or very slightly toothed towards the point, which is acute in the fertile, bluntly rounded in the barren frond. *sori* in a continuous line along both edges. Malayan Peninsula, &c. SYN. *Isoloma lanuginosum.*

L. linearis (linear). *rhiz.* wiry, creeping. *sti.* wiry, flexuose, black, shining, 4in. to 8in. long. *fronds* 6in. to 12in. long, ½in. broad, simply pinnate; pinnæ ¼in. long, two lines deep, upper edge very slightly toothed, the lower ones often with a considerable space between them. *sori* in a continuous line along the upper edge. Australia, New Zealand, &c., 1820. Greenhouse.

L. lobata (lobed). *rhiz.* short-creeping. *sti.* 6in. to 9in. long, firm, erect. *fronds* simple or with a long unbranched apex, and one to six pairs of erecto-patent branches, 3in. to 6in. long; pinnules about ½in. long, ¼in. broad, lower ones decurved principally at base, the outer margin rounded, upper three or four times lobed. *sori* marginal in the lobes. Neilgherries, Ceylon, Polynesian Islands, &c. SYNS. *L. obtusa, L. recurvata* (H. S. F. i. 70A), *Synaphlebium lobatum.*

L. Lobbiana (Lobb's). A synonym of *L. cultrata.*

L. media (intermediate). *sti.* 6in. to 12in. long, wiry, flexuose. *fronds* 6in. to 12in. long, deltoid in general outline, bi- or tripinnate; pinnæ 3in. to 4in. long, two to three lines deep, the lower line nearly straight, the upper one rounded. *sori* in a continuous marginal line. Tropical Australia, &c. Greenhouse. SYN. *Synaphlebium medium.*

L. microphylla (small-fronded). *rhiz.* creeping, fibrillose. *sti.* flexuose, wiry, 3in. to 6in. long. *fronds* 6in. to 18in. long, 2in. to 4in. broad, bi- or tripinnatifid; primary pinnæ distant, flexuose, 1in. to 4in. long; pinnules entire, or cut down to the rachis into several obversely triangular lobes, which, when fertile, are often not more than one line broad. *sori* in a continuous marginal line. New Zealand and temperate Australia. Greenhouse. SYN. *Isoloma microphyllum.*

L. oblongifolia (oblong-fronded). A synonym of *L. pectinata.*

L. obtusa (obtuse). A synonym of *L. lobata.*

L. parvula (small). *sti.* 6in. to 8in. long, naked, stramineous. *fronds* about the same length, bipinnate when fully developed, with a few distant spreading pinnæ, 2in. to 3in. long, ⅝in. broad; pinnules close, sub-rhomboidal, less than ¼in. broad, upper edge slightly curved. *sori* continuous. Trinidad.

L. pectinata (comb-like). *rhiz.* stout, wide-creeping, scandent. *sti.* erect, very short. *fronds* 1ft. to 1½ft. long, 1in. to 2in. broad, simply pinnate; pinnæ ½in. to ⅔in. long, ¼in. deep, the lower line nearly straight, the upper margin round, slightly crenate, point not very blunt, close together, but not imbricated. *sori* in an interrupted line along the upper edge. Malayan Peninsula. SYNS. *L. oblongifolia, Synaphlebium pectinatum.* (H. S. F. i. 61D.)

L. recurvata (recurved). A synonym of *L. lobata.*

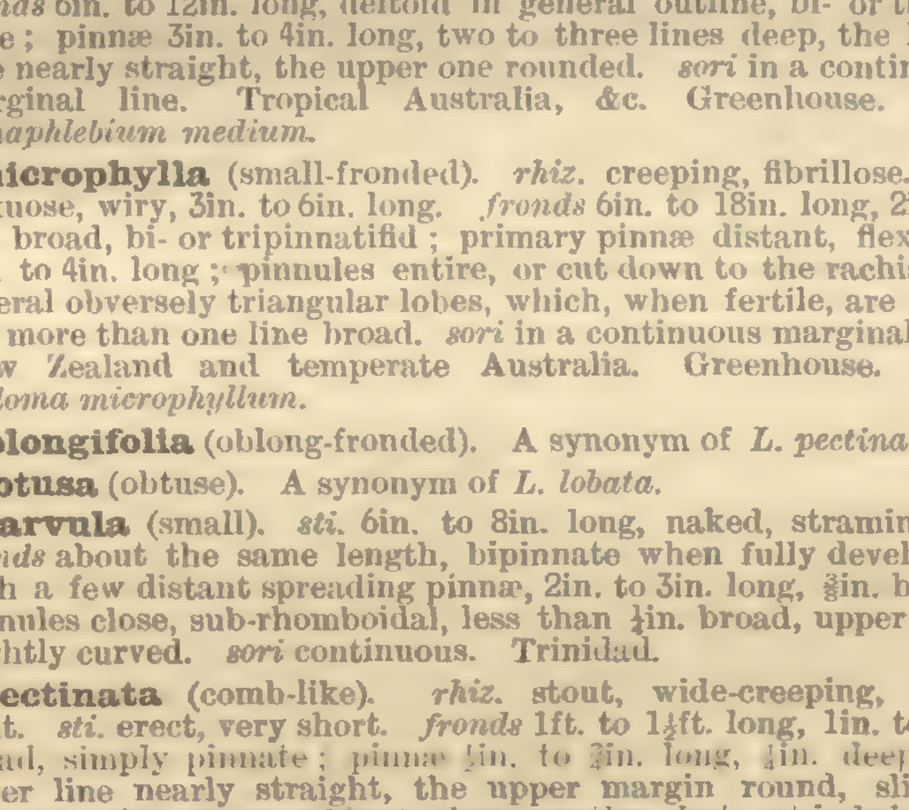

FIG. 443. LINDSAYA RENIFORMIS.

L. reniformis (kidney-shaped).* *sti.* wiry, flexuose, 4in. to 6in. long. *fronds* sagittate-acuminate, with a deep basal sinus, 2in. to 4in. across, sometimes lobed. *sori* continuous along upper and outer edge. Guiana. A very rare species, resembling *Adiantum reniforme* and *Trichomanes reniforme.* SYN. *Isoloma reniforme.* See Fig. 443.

L. rigida (rigid). *rhiz.* wide-creeping. *sti.* 4in. to 6in. long, rigid, erect, prickly towards the base. *fronds* with a long unbranched central point, and one to four pairs of flexuose lateral branches, 4in. to 8in. long; pinnules three to four lines broad, two lines deep, lower edge often falcate, upper three or four-lobed. *sori* in a marginal line on the lobes. Malayan Peninsula. This species resembles *L. stricta.* (H. S. F. i. 63A.)

L. sagittata (arrow-pointed). *sti.* wiry, flexuose, 4in. to 6in. long, black, polished. *fronds* sagittate-acuminate, with a deep basal sinus, 2in. to 4in. across, sometimes lobed. *sori* continuous. Guadeloupe and French Guiana.

L. stricta (upright).* *rhiz.* short-creeping, fibrillose. *sti.* rigid, erect, 1ft. to 2ft. long. *fronds* simply pinnate, 1ft. to 2ft. long, ½in. broad, or with one or two pairs of erect, rigid, lateral branches; pinnules ¼in. broad, less deep, the lower line often considerably decurved, the upper rounded, nearly entire, closely placed. *sori* in a continuous line round the upper edge. Tropical America, 1839. A variable and pretty form. SYN. *L. elegans.*

L. tenera (tender). A form of *L. flabellulata.*

L. trapeziformis (diamond-shaped).* *rhiz.* short, creeping. *sti.* strong, erect, 6in. to 12in. long. *fronds* 6in. to 15in. long, with a long entire point and one to four pairs of rather rigidly erecto-patent branches, which are often 6in. to 12in. long; pinnæ ¾in. to 1½in. long, ½in. to ⅔in. deep, the lower line nearly straight, or curved upwards or downwards, the upper rounded, entire, closely packed, but scarcely imbricated. *sori* in a continuous line round the upper margin. Tropical Asia and America, &c., 1819. A beautiful species. SYN. *L. horizontalis.* (H. S. F. i. 62B.)

L. trichomanoides (Trichomanes-like). *rhiz.* creeping, fibrillose. *sti.* 4in. to 6in. long, slender, wiry. *fronds* 4in. to 9in. long, 2in. to 3in. broad, ovate-oblong, bipinnatifid; pinnæ 2in. to 3in. long, lanceolate, erecto-patent, cut down quite to the rachis below into cuneate pinnules, which are again broadly lobed on the upper edge. New Zealand, &c. A pretty greenhouse or Wardian case plant.

LINEÆ. Including *Erythroxyleæ.* A small order of herbs, shrubs, or rarely trees, glabrous or rarely hirsute or tomentose. Flowers regular, hermaphrodite, usually terminal, in racemes, panicles, corymbs, heads, fascicles, or spikes; petals often blue, yellow, or white, rarely pink, fugacious, or, in a few genera, persistent. Leaves alternate, or very rarely opposite, simple, entire. *Linum usitatissimum* yields the flax and linseed of commerce. There are fourteen genera, and 135 species. Illustrative genera are: *Erythroxylon, Ixonanthes, Linum.*

LINEAR. Narrow; when the two sides are nearly

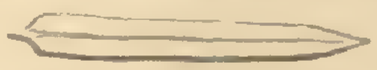

FIG. 444. LINEAR-ACUTE LEAF.

parallel. A Linear-acute leaf is shown in Fig. 444.

LING. *See* **Calluna.**

LINGULATE. Tongue-shaped.

LINNÆA (so named by Gronovius, after the great Linnæus, at his own request). ORD. *Caprifoliaceæ.* A monotypic genus. The species is a very pretty, hardy, trailing, sub-shrubby, creeping evergreen, and forms broad leafy patches. It is a desirable plant for rock gardens, preferably in a rather shaded situation; and thrives best in a moist peaty soil. Linnæa will also grow luxuriantly in large pots, filled with peat soil. Propagated readily by divisions.

L. borealis (Northern).* *fl.* flesh-coloured, twin, pendulous, fragrant; peduncles axillary; corolla campanulate, tube cylindrical; calyx double. May and June. *l.* roundish or ovate, firm, slightly hairy. The cold regions of the Northern hemisphere (Britain). (Sy. En. B. 644.)

LINOSYRIS. *See* **Chrysocoma Linosyris.**

LINUM (from *Linon*, the old Greek name used by Theophrastus). Flax. ORD. *Lineæ.* A genus comprising about eighty species of glabrous or rarely pubescent, annual, biennial, or perennial herbs or shrubs, natives of all the temperate regions of the globe, but rare in the tropics. Flowers yellow, blue, or rarely rosy, blood-coloured or white, very fugitive, in terminal or axillary

Linum—*continued.*

racemes, sometimes loosely racemose-subcymæform, sometimes in contracted fascicles or spicate heads. Leaves alternate or rarely opposite, narrow, entire, one to many-nerved. Linums, whether of annual or perennial duration, are exceedingly ornamental and very free-flowering plants. The hardy perennial species are well suited for rockwork embellishment, and some of them succeed in the mixed border, where the soil is well drained. In all northerly parts of the country, a sheltered, warm position should be afforded, to insure their safety. Propagation may be effected by seeds, by cuttings, or sometimes by divisions in spring. Seeds are generally produced freely, and may be sown in pots, about March, and the young plants afterwards transferred to the open air; or they may be sown outside, in April. Cuttings should be taken in summer, when the wood is sufficiently firm without being too much hardened, and inserted in a shady position, under a hand glass. *L. grandiflorum*, one of the best showy annuals in cultivation, may be raised in any quantity from seeds sown, in March, where the plants are intended to flower. A well-drained sandy loam, with a little leaf mould or peat intermixed, may be recommended for Linums grown outside; but they are not usually fastidious regarding soil. All the undermentioned are hardy herbaceous perennials, except where otherwise stated.

L. alpinum (alpine).* *fl.* blue, large, few, rather corymbose; inner sepals blunt, outer ones acutish. July and August. *l.* linear, awl-shaped, spreading, full of pellucid dots. *h.* 6in. Europe, 1739. (S. B. F. G. 17.)

L. angustifolium (narrow-leaved). Pale Flax. *fl.*, petals pale purple, with a slight notch; sepals acutish. July. *l.* linear-lanceolate, acute. *h.* 1ft. Europe (Britain). Plant glabrous, many-stemmed, rather erect. (Sy. En. B. 291.)

FIG. 445. LINUM GRANDIFLORUM, showing Habit and detached Portion of Inflorescence.

L. arboreum (tree-like).* *fl.* yellow, handsome, large, few, somewhat capitate; sepals acuminated. May and June. *l.* cuneiform, obtuse, alternate, recurved. *h.* 1ft. Crete, &c., 1788. A handsome dwarf spreading shrub, rather tender, but it will thrive in a warm sunny spot in the open border; it should be sheltered by a few branches during severe winters. (B. M. 234.)

L. austriacum (Austrian). *fl.* pale bluish-purple; petals retuse; fructiferous pedicels deflexed. June and July. *l.* linear or rather lanceolate, acute, erectish, full of pellucid dots. Branches racemose. *h.* 1ft. to 2ft. Austria, 1775. Plant glabrous, erect. (B. M. 1806.)

L. campanulatum (bell shape-flowered). *fl.* yellow, corymbose. June to August. *l.* alternate; lower ones rounded at the apex; middle ones furnished with a small point; upper ones obversely lanceolate, acuminate. *h.* 1ft. South Europe, 1795. Plant scabrous at the base, glaucous. (L. B. C. 1254.)

L. Chamissonis (Chamisso's). A synonym of *L. Macraei*.

L. flavum (yellow).* *fl.* transparent golden-yellow, densely and numerously produced in branched heads; sepals acuminated, serrulated. June to August. *l.* alternate, narrow-lanceolate, acute, sessile, with smooth margins. *h.* 1ft. to 1½ft. Europe,

Linum—*continued.*

1793. A very handsome plant, woody at the base; it is not quite hardy in the Northern parts of England, but will withstand severe weather if slightly protected. (B. M. 312.)

L. grandiflorum (large-flowered).* *fl.* rose-coloured, large, loosely panicled; sepals lanceolate, acute, ciliately serrated. June and July. *l.* linear-lanceolate, acute, erectish. *h.* 6in. to 12in. North Africa, 1820. Hardy annual. Plant glabrous, erectish, branched at the base. See Fig. 445. (B. M. 4956.) The form known as *rubrum* has brighter-coloured flowers than the type.

L. Macraei (MacRae's).* *fl.* orange; sepals ovate, acuminated. Summer. *l.* opposite or alternate, lanceolate, acuminated, stiff. Stems shrubby at the base. *h.* 1ft. Chili, 1864. Greenhouse or half-hardy. SYN. *L. Chamissonis*. (B. M. 5474.)

L. monogynum (one-styled). *fl.* yellow, numerous; sepals ovate-lanceolate acute. June and July. *l.* alternate, lanceolate. Stem shrubby. *h.* 1ft. New Zealand, 1822. (B. M. 3574.)

L. narbonense (Narbonne).* *fl.* of a beautiful blue, but sometimes white, large, disposed in sub-corymbose panicles. May to July. *l.* alternate, distant, lanceolate-linear, very acute, and rather stiff. *h.* 2ft. Europe, 1759. Plant glabrous, erect, rather glaucous. (L. B. C. 190.)

L. nervosum (nerved). *fl.* blue, large, in loose panicles; petals emarginated or pointed, crenated at the apex. June and July. *l.* lanceolate, pointed, glabrous. Stem hairy at the base. *h.* 1ft. to 1½ft. Eastern Europe, 1822.

L. perenne (perennial). *fl.* pale blue; petals emarginate; outer sepals hardly mucronate, inner ones blunt. June and July. *l.* linear, acute, erect. *h.* 1ft. to 1½ft. Europe (Britain). Plant glabrous, ascending. (Sy. En. B. 290.)

L. salsoloides (Salsola-like). *fl.* white, with a purple centre or eye; sepals ovate, acuminated, fringed with glandular hairs in the middle. June and July. *l.* linear-setaceous, smoothish. Stems shrubby at the base, branched, and a little twisted; branches ascending. *h.* 1ft. South-west Europe, 1810. Hardy evergreen.

L. sibiricum (Siberian). *fl.* of a beautiful blue, large; sepals oval, outer ones acutish, inner ones very blunt. *h.* 3ft. to 4ft. Siberia, 1775. Plant glabrous, erect. (B. R. 1163.)

L. tauricum (Taurian).* *fl.* yellow, in dichotomous panicles; sepals acuminated, serrulated. June to August. *l.* alternate, glaucous; lower ones rather spathulate, upper ones lanceolate. *h.* 1½ft. Caucasus, 1818. Hardy evergreen shrub.

L. trigynum. *See* **Reinwardtia trigyna.**

FIG. 446. FLOWERING STEM OF LINUM USITATISSIMUM.

L. usitatissimum (most-used). Common Flax. *fl.* blue, in corymbose panicles; petals rather crenated; sepals ovate, acute. June and July. *l.* lanceolate or linear, acute. *h.* 1½ft. Europe. Plant erect, glabrous. Hardy annual. See Fig. 446. (Sy. En. B. 292.)

L. viscosum (clammy). *fl.* pale purple, rarely blue, in an erect corymb. June to August. *l.* lanceolate, alternate and somewhat opposite, and, as well as the stems, hairy. *h.* 1ft. to 2ft. Europe, 1807.

LION'S EAR. *See* **Leonotis.**

LION'S FOOT. *See* **Leontopodium.**

LION'S TAIL. *See* **Leonotis Leonurus.**

LIPARIA (from *liparos*, oily, shining; in allusion to the shining surface of the leaves). ORD. *Leguminosæ*. A genus comprising about four species of greenhouse shrubs, confined to the Cape of Good Hope. Flowers yellow, in terminal heads; bracts large, imbricate, involucrate; standard oval-oblong; wings oblong; keel narrow, acute. Leaves simple, entire, coriaceous. *L. parva* and *L. sphærica* are the two species introduced. They thrive in a compost of fibry loam and turfy peat, with a small quantity of sand added. Propagated by cuttings of young shoots, inserted in sand, under a bell glass. Water must at all times be given with great care.

L. parva (small). *fl.* yellow, small, capitate; bracts orbicular, acuminate, with bearded edges; segments of calyx lanceolate-elliptic, bearded. March and April. *l.* ovate-elliptic, acuminate, three to five-nerved, spreading or reflexed. 1840.

L. p. angustifolia (narrow-leaved).* This is a variety having narrower leaves than the type. 1840. (B. M. 4034.)

L. sphærica (spherical). *fl.* orange, in dense nodding heads, fully 3in. or 4in. in diameter. July and August. *l.* lanceolate-oblong, pungent, three to seven-nerved, smooth. *h.* 4ft. 1794. (B. M. 1241.)

LIPARIS (from *liparos*, smooth, oily; referring to the leaves). SYNS. *Alipsa*, *Sturmia*. Including *Empusa* and *Platystylis*. ORD. *Orchideæ*. A genus comprising about 100 species of stove or hardy, small-flowered, terrestrial and epiphytal orchids, broadly dispersed through the temperate and warm regions of the globe. Flowers usually dull white, green, or yellow, small, racemose; column rather long, semicircular or two-winged in the upper part, but not branched. Leaves few, sometimes solitary at the base, or below the middle of the stem, on sheathing petioles, often at length contracted at the joint, membranaceous or slightly fleshy, equally many-nerved or sparingly ribbed. Very few species are worth growing for ornament. The hardy sorts thrive in a moist, shady situation, and do best when planted very shallow, and covered with moss. The stove kinds require a compost of fibry peat, sphagnum, charcoal, and very small pieces of crocks, and are most suitably grown in shallow, open baskets. Except where otherwise indicated, the undermentioned species require stove treatment.

L. atropurpurea (dark purple). *fl.* dark purple; lip oblong, obtuse, recurved, crenulate; lateral sepals oblong-lanceolate, oblique; petals very long, filiform; raceme erect, few-flowered; scape terete. June. *l.* two or three, nearly round, acuminate, petiolate, folded, obliquely cucullate at base. Ceylon, 1865. A very pretty species. (B. M. 5529.)

L. decursiva (decurrent). *fl.* green, darker on each side of the whitish mid-line of the lip; peduncle narrowly winged. *l.* cuneate-oblong, with decurrent bases. Pseudo-bulbs thick. India, 1884.

L. elata (tall). *fl.*, lip purple, obovate, retuse, bicallose at base; sepals herbaceous, lateral ones recurved; racemes erect, many-flowered; scape angular. *l.* many, oblong, acute, folded, shorter than the racemes. East Indies and Brazil. (B. R. 1175.)

L. foliosa (leafy). *fl.* yellowish-green; lip oblong, obtuse, recurved; sepals and petals reflexed, equal. September. *l.* several, oblong-lanceolate, acute. Mauritius, 1823. (B. M. 2709; B. R. 882; L. B. C. 1097.)

L. formosana (Formosan). *fl.* light purple, with green borders; lip sagittate, acute. March. *l.* oblong, acute, plaited. Formosa, 1880.

L. lilifolia (Lily-leaved).* *fl.* brownish-purple, with a leaflike lip. July. *l.* ovate. North America. Hardy. (B. M. 2004, under name of *Malaxis lilifolia*.)

L. Lœselii (Lœsel's). *fl.* pale yellow; lip obovate, entire, recurved; spikes few-flowered. July. *l.* two, narrow-elliptical; stalk three-cornered. North America and Europe (Fens of East England). Hardy. (Sy. En. B. 1488.)

L. pendula (pendulous). *fl.* whitish-green, small, disposed in slender, pendulous racemes, 1ft. long, giving the plant an elegant appearance. India.

LIPARIS. A genus of moths, belonging to a family of which the larvæ are at times very destructive to cultivated trees (*see* **Hawthorn Caterpillars**). The larvæ of all the species are hairy, and often bear peculiar

Liparis—*continued.*

tufts of hair on certain parts of the body, and they are usually bright-coloured.

FIG. 447. CATERPILLAR OF LIPARIS AURIFLUA (GOLD-TAIL MOTH).

L. auriflua (Gold-tail Moth) is satiny-white, with one or more rounded black spots on the upper wings,

FIG. 448. LIPARIS CHRYSORRHÆA (BROWN-TAIL MOTH).

and a tuft of golden-yellow down at the tip of the body. The larva (see Fig. 447) bears three rows of

FIG. 449. CATERPILLAR OF LIPARIS CHRYSORRHÆA.

tubercles along the body; those nearest the back are black, those in the middle bear each a tuft of whitish

Liparis—*continued.*

hairs, those below are coral-red; the fifth and sixth segments are humped above. It feeds chiefly on Hawthorn, and is very common in England.

L. chrysorrhœa (Brown-tail Moth) is pure white (see Fig. 448), with a large tuft of brown hairs at the tip of the abdomen, used for covering over the eggs when laid. The larva is black, with warty tubercles, emitting tufts of snow-white hairs, on the second and on the fifth to twelfth segments, and on the tenth and eleventh segments are scarlet cup-shaped spots in the middle of the back (see Fig. 449). It feeds on fruit-trees, Hawthorn, Oak, &c.

L. dispar (Gipsy Moth). In this species, the males (see

FIG. 450. LIPARIS DISPAR (MALE).

Fig. 450) are dark brown, the upper wings with zigzag darker markings, and a central spot. The females (see

FIG. 451. LIPARIS DISPAR (FEMALE).

Fig. 451) are much larger and heavier, with dingy white wings barred with darker belts. The larva is black,

FIG. 452. CATERPILLAR OF LIPARIS SALICIS (SATIN MOTH).

netted with grey; there is a grey median dorsal line, and each segment bears two dark blood-coloured dorsal tubercles, and four grey ones on the sides. It feeds on Hawthorn, Blackthorn, Plums, Apples, &c., and in France often does much damage.

Liparis—*continued.*

L. monacha (Black Arches), like the last, shows a marked inequality in size of male and of female, and, like it, is often most hurtful to trees on the Continent—Oak, Birch, &c., but more especially to conifers, from which it often strips the leaves. The species is rare in Britain.

L. salicis (Satin Moth). The wings of this moth are satiny-white; the body is black, but covered with long white hairs. The larva (see Fig. 452) bears a row of white spots down the middle of the back, bordered on each side by a broad black stripe, in which lie eleven red tubercles; sides grey, with red tubercles. The larvæ usually feed on Poplars and Willows, but, at times, also on other trees.

Hand-picking and beating appear to be the best methods to limit the numbers of all the species.

LIPOSTOMA. A synonym of *Coccocypselum*.

LIPPIA (named in honour of Augustus Lippi, a French physician and traveller in Abyssinia). Including *Aloysia* and *Zapania*. ORD. *Verbenaceæ*. A large genus (almost ninety species) of stove or greenhouse, glabrous, pilose, tomentose, pubescent, or hirsute, shrubs or sub-shrubs, rarely herbs, mostly American, a few being found in Africa, and two broadly dispersed over the warmer regions of the globe. Flowers small, solitary, sessile, in the axils of the bracts. Leaves opposite or ternately whorled, rarely alternate, entire, toothed, or lobed, flat or rugose. But few of the species are in cultivation. They require a rich light soil. Cuttings of the young shoots will root readily in sandy soil, in any close, warm frame.

L. citriodora (Citron-scented).* Lemon Plant; Scented Verbena. *fl.* nearly white, small, forming an unbranched panicle. Summer and autumn. *l.* in whorls of three; veins on each side of the midrib running parallel to each other. *h.* 3ft. Chili, 1794. Greenhouse (hardy in the South of England). The leaves of this species emit a delightful fragrance when bruised. SYNS. *Aloysia citriodora*, *Verbena triphylla* (B. M. 367).

L. nodiflora (node-flowered). *fl.* white or purple; heads dense, globose, on axillary peduncles. May to September. *l.* obovate, oblong, or lanceolate, rough, tapering and entire below the middle, serrate above, 1in. long. *h.* 6in. to 12in. North America. Half-hardy. SYN. *Zapania nodiflora*.

L. reptans (creeping). *fl.* white, red; heads ovoid-globose, at length oblong. June. *l.* spathulate, serrate above, penninerved, 1in. to 1½in. long. *h.* 1ft. South America, 1847. Greenhouse.

LIQUIDAMBAR (from *liquidus*, liquid, and *ambar*, amber; referring to the gum, called liquid storax, produced by this genus). ORD. *Hamamelideæ*. A genus of about four species of ornamental, balsam-bearing, deciduous trees, natives of the Levant, North America, and China, with catkins of monœcious flowers, which are surrounded by a four-leaved, deciduous involucre; male catkins conical or sub-globular; females sub-globular, surrounded by scales. Leaves alternate, slender, petiolate, stipuled. The species principally grown is *L. styraciflua*, the leaves of which, according to Loudon, are very fragrant at all seasons, "but in spring, when they are unfolding, after a warm shower, the surrounding air is filled with their refreshing odour." Liquidambars thrive best in a moist loamy soil, and in a sheltered situation. Propagated freely by layers, which may be taken off at the end of the first autumn after they have been formed. Imported seeds (of the two species described below), allowed to remain in the catkins until the time of sowing, will be quite a year germinating. The seedlings usually attain a height of from 6in. to 8in., and may be transplanted out that year or the next.

L. imberbe (beardless). *l.* palmate, usually five-lobed, with the sinuses at the base of the veins, smooth. *h.* 10ft. to 20ft. Levant, 1759. A large bush, of slow growth, with numerous small branches crowded together into an irregular head. It has a more shrubby habit than *L. styraciflua*. SYN. *L. orientalis*.

L. orientalis (Eastern). A synonym of *L. imberbe*.

L. styraciflua (storax-flowing).* Sweet Gum. *fl.* greenish-yellow. Spring. *l.* palmately lobed, with the sinuses at the base

Liquidambar—*continued.*

FIG. 453. BRANCH OF LIQUIDAMBAR STYRACIFLUA, bearing (1) Female and (2) Male Flowers.

of the veins, villous. *h.* 30ft. to 50ft. North America, 1681. An elegant tree, somewhat resembling the Maple, but having alternate leaves, which change towards the autumn to a bright red, and remain on the tree until the first frosts. See Figs. 453 and 454.

FIG. 454. FEMALE FLOWERING BRANCH OF LIQUIDAMBAR STYRACIFLUA.

In addition to the two species above described, there are two or more species recently discovered in China—one or more being the trees which furnish the wood used by the Chinese to make the chests in which they export their tea.

LIQUID MANURE. *See* **Manures.**

LIQUORICE. *See* **Glycyrrhiza.**

LIRIODENDRON (from *Leirion*, a Lily, and *dendron*, a tree). Tulip-tree. ORD. *Magnoliaceæ*. A monotypic genus, the species being an elegant, hardy, deciduous tree. It thrives best in a good deep loamy soil; and a sheltered, but not overshadowed, situation is most suitable. Propagated by seeds, which should be sown in a rather moist sandy loam, in a shady position, during autumn.

L. tulipifera (tulip-bearing).* *fl.* variegated with green, yellow, and orange, large, solitary, terminal, very fragrant, each blossom furnished underneath with two deciduous bracts; petals six, connivent in two imbricated series; sepals three, reflexed; carpels in an oblong spike two-seeded, at length samaroid and

Liriodendron—*continued.*

indehiscent. Summer. *l.* smooth, simple, alternate, stipulate, three-lobed; the terminal lobe emarginately truncate, the lateral ones with two sinuses. *h.* 75ft. to 100ft. North America, 1688. A splendid tree, resembling an erect-growing Plane in habit. See Fig. 455.

FIG. 455. LIRIODENDRON TULIPIFERA, showing Flowering Branchlet, and Longitudinal Section of Flower, with Sepals and Petals removed.

LIRIOPE (named after the nymph Liriope). ORD. *Hæmodoraceæ*. A monotypic genus. The species is a pretty cool greenhouse plant, with a short, thick, sometimes stoloniferous rhizome. For culture, *see* **Ophiopogon** (under which this genus was formerly included).

L. graminifolia (grass-leaved). *fl.* rather small, in fascicles or clusters of three to five, on a spicate raceme 6in. to 12in. long; perianth deep violet-blue, sub-campanulate, deeply divided into six segments; scape erect, dark livid-purple. October. *l.* all radical, 6in. to 12in. long, linear-lanceolate, obtuse, three-nerved, obscurely striated, surrounded by a few membranous scales at the base. China and Japan, 1821. SYN. *Ophiopogon spicatus* (under which name it is figured in B. M. 5348, B. R. 593, and L. B. C. 694).

LISIANTHUS (said to be derived from *lysis*, dissolution, and *anthos*, a flower; a name given to the plant on account of the medicinal virtues it possesses of dissolving humours, being a powerful cathartic). Sometimes spelt *Lisyanthus*. ORD. *Gentianeæ*. A genus comprising about fifty species of greenhouse or half-hardy herbs or shrubs, natives of tropical America. Flowers blue, purple, white, or yellowish-green, showy, erect or nodding, in terminal cymes; corolla funnel-shaped; tube shortly cylindrical at base; limb oblique, or equally five-lobed, often shorter than the tube, obtuse or acute, twisted. Capsules nodding, or rarely erect. Leaves opposite, sessile or petiolate, narrow, rather fleshy-coriaceous, rarely broad, membranaceous. The species of *Lisianthus*, and also those of *Eustoma*, which are more frequently referred to as belonging to the same genus, are amongst the most difficult of plants to cultivate successfully. They are very handsome when in flower, and, consequently, well repay for the devotion of a little more than ordinary attention, with a view to bringing them to perfection. Some of the species are only of annual duration, and may be increased by seeds; others, of a shrubby habit, may be propagated from cuttings. *Eustoma Russellianum*, the plant generally known and grown in gardens as *Lisianthus Russellianus*, is more frequently seen than any of the species of the latter genus. If not a biennial, it should be treated as such, by preparing plants one season to flower the next. The seeds are very minute, and should be sown, in spring, on the surface of some light soil,

Lisianthus—*continued.*

merely covering by laying a pane of glass over the pot, and keeping it shaded in a situation where there is a little bottom heat, until germination takes place. When large enough to handle without injury, the young plants may be placed singly in small pots, using, at this and subsequent times, a compost of loam, leaf mould, and peat, in about equal quantities, with an addition of some charcoal or sharp sand. A bed where there is a slight bottom heat from fermenting material, is the best place for the plants throughout the summer. They should be wintered in a warm greenhouse, choosing a light position, and watering very carefully. Early the following spring, they should be returned to a little bottom heat, and, when started into growth, be placed in 8in. pots for flowering. Mildew often proves very destructive, and must be guarded against. *L. princeps* is a very distinct and fine plant, rarely seen in cultivation.

L. acutangulus (acute-angled). *fl.* green, yellow, pendulous; peduncles dichotomous, panicled. January to May. *l.* connivent at the base; lower ones cordate, upper ones ovate. Stem fistular, acutely tetragonal. *h.* 3ft. St. Martha, 1845. Annual. (B. M. 4324.)

L. exaltatus (exalted). A synonym of *Eustoma exaltatum.*

L. Œrstedii (Œrsted's). *fl.* greenish-yellow, whitish at the edge, unilateral, nodding, disposed in terminal racemose panicles; corolla infundibuliform, oblique *l.* opposite, elliptic or obovate-oval. Nicaragua, 1871. Evergreen.

L. princeps (chief).* *fl.* rich scarlet, melting into yellow at either end, with an emerald-green five-lobed limb, about 3in. long; disposed in clusters of four at the ends of the drooping twigs. *l.* ovate, acuminate, deep green, opposite. New Grenada. Evergreen.

L. pulcher (fair).* *fl.* scarlet, pendulous; panicles terminal, trichotomous; stamens exserted. August. *l.* petiolate, elliptic-lanceolate. Branches bluntly tetragonal. *h.* 5ft. New Grenada, 1847. Evergreen. (B. M. 4424.)

L. Russellianus (Duke of Bedford's). A synonym of *Eustoma Russellianum.*

LISSANTHE (from *lissos*, smooth, and *anthos*, a flower; in reference to the limb of the corolla being destitute of hairs). ORD. *Epacrideæ.* A genus of three species of pretty, greenhouse, evergreen, erect shrubs, inhabiting Western Australia and Tasmania, allied to *Leucopogon.* Flowers white or pink, small, in terminal or axillary spikes or racemes; corolla funnel-shaped; limb beardless. Leaves scattered, narrow, obtuse or pungent, often hoary underneath, striate-nerved. The species here described is probably the only one yet introduced. For culture, *see* **Epacris.**

L. sapida (savoury). *fl.* white, tipped with green; racemes two or three-flowered, recurved. June. *fr.*, berries red, acid, edible. *l.* oblong-linear, mucronate, with revolute margins, whitened, and striated beneath. *h.* 4ft. New South Wales, 1823. (B. M. 3147; B. R. 1275.)

LISSOCHILUS (from *lissos*, smooth, and *cheilos*, a lip; in reference to the labellum). SYN. *Hypodematium.* ORD. *Orchideæ.* A genus comprising about thirty species of usually stove terrestrial orchids, natives of tropical and Southern Africa. They are distinguished from *Eulophia* in the great disparity between sepals and petals. Flowers often showy, pedicellate, in simple racemes; sepals free, equal, spreading; petals broader or larger than the sepals; lip affixed to the base of the short, semi-terete, erect column; scapes at the sides of the pseudo-bulbs or rhizomatose, leafless, many-sheathed. Leaves long, often narrow, prominently veined or plicate. The stove species require a fibrous loamy soil, with good drainage; and a liberal supply of water will be needed when growing. A decided season of rest is necessary after all growth has ceased, when water may, for some time, be entirely withheld. The undermentioned are the species best known to cultivation.

L. Horsfallii (Horsfall's).* *fl.*, sepals rich brown; petals large, white, with a delicate shade of rose; lip green and rich purple; spike several-flowered. *l.* plicate, sharp-pointed, 2ft. to 3ft. long by 4in. to 6in. broad. Old Calabar, 1865. A very handsome plant. (B. M. 5486.)

Lissochilus—*continued.*

L. Krebsii (Krebs').* *fl.* scattered, 1¼in. in diameter; sepals green, with dull purple blotches, broadly linear-oblong; petals pale golden-yellow, three to four times as large as the sepals; lip pendulous, sessile, brownish inside; racemes 1ft. to 1½ft. long, twenty to thirty-flowered; scape 2ft. to 3ft. high, stout. *l.* in copious tufts from base of pseudo-bulb, 8in. to 12in. long, 2in. to 3in. broad. Pseudo-bulbs 2in. to 3in. long, ovoid or elliptic-oblong. Natal, 1867. (B. M. 5861.)

L. speciosus (showy). *fl.* yellow, butterfly-like, produced in large and beautiful spikes. June. Cape of Good Hope, 1818. A handsome, free-flowering, greenhouse species. (B. R. 573.)

L. streptopetala (twisted-petaled). *fl.* yellow; sepals oblong-obtuse; petals twice the size of the sepals, twisted at the base; middle lobe of lip roundish, emarginate; spur short, conical. March. *l.* linear-lanceolate, acute, three-nerved, sheathing at the base. Brazil, 1822. SYN. *Eulophia streptopetala* (B. M. 2931; B. R. 1002).

LISTROSTACHYS ARCUATA. *See* **Angræcum arcuatum.**

LISYANTHUS. *See* **Lisianthus.**

LITANTHUS (from *litos*, small, and *anthos*, a flower; because of the extremely small size of the plant). ORD. *Liliaceæ.* A monotypic genus. The species is an exceedingly small, greenhouse, bulbous plant, having a bulb about the size of a pea. For culture, *see* **Scilla.**

L. pusillus (very small). *fl.* white, solitary, small, drooping; perianth tubular, cylindrical, six-cleft. August. *l.* succeeding the flowers. *h.* 2in. South Africa. 1870. This forms a pretty object when grown in clumps in a pot. (B. M. 5995.)

LITHOSPERMUM (the old Greek name used by Dioscorides, and derived from *lithos*, a stone, and *sperma*, a seed; in allusion to the hard, stone-like seeds). Gromwell. Including *Batschia.* ORD. *Boragineæ.* A considerable genus (forty species have been described) of usually hardy biennial or perennial herbs, sub-shrubs, or rarely small shrubs, widely spread over Europe and Northern Asia, although most of the species belong to the Mediterranean region. Flowers white, yellow, blue, or violet, disposed in bracteated cymes; corolla regular, funnel-shaped or salver-shaped, without scales at the throat. Nut not contracted at the base, having a flat surface of adhesion to the receptacle. Leaves alternate, usually narrow. Only a few species of this genus are worthy of culture, and these form exceedingly pretty plants for borders, rockwork, and such-like places. They thrive best in a sandy soil or a rich loam, either of which must be well drained. Propagated by cuttings, by divisions, or by seeds.

L. canescens (hoary). *fl.* yellow, fulvous, nearly sessile; tube of corolla twice as long as the calyx. June and July. *l.* oblong, obtuse, emarginate at the apex. Stem erect, divided into two leafy cymes at top. North America, 1826. Herbaceous perennial. SYN. *Batschia canescens.* (B. M. 4389.)

L. fruticosum (shrubby). A synonym of *L. prostratum.*

L. Gastoni (Gaston's).* *fl.* bright sky-blue, twice as large as those of *L. prostratum*, and disposed in terminal clusters. Summer. *l.* obovate-lanceolate, slightly rough with adpressed hairs. *h.* 1ft. to 1½ft. Western Pyrenees. A rare and very desirable herbaceous perennial. (B. M. 5926.)

L. hirtum (hairy). *fl.* yellow, pilose outside; tube of corolla shorter than the calyx. May to July. *l.* linear-lanceolate, obtuse, 2in. to 3in. long. *h.* 6in. South United States, 1812. Perennial. SYN. *Batschia Gmelini.*

L. petræum (rock). A synonym of *Moltkia petræa.*

L. prostratum (prostrate).* *fl.* deep blue, striped with reddish-violet, axillary, distant, sessile, disposed in terminal leafy spikes on the older branches; tube of corolla three times longer than the calyx. Summer. *l.* sessile, lanceolate-linear, hispid. South-western Europe, 1825. A very handsome dwarf, trailing, evergreen sub-shrub, with prostrate spreading stems. From its bright blue, Gentian-like flowers, it is sometimes called the Gentian Lithospermum. The form of growth assumed by this plant eminently fits it for rockwork. It can be increased only by cuttings, which must be struck from the previous year's growth, inserted in fine sand and peat, and kept shaded and cool for a few weeks. SYN. *L. fruticosum.*

L. purpureo-cæruleum (purplish-blue).* *fl.* at first red, afterwards purple, more than ½in. in diameter, axillary and at the sides of the leaves, disposed in terminal, short, twin racemes. Early summer. *l.* rough, lanceolate, acute, attenuated at the base, with revolute margins, 1½in. long. *h.* 1ft. Europe (Britain). A pretty perennial species, with creeping barren and erect flowering stems. (Sy. En. B. 1100.)

LITHRÆA. *See* **Rhus.**

LITOBROCHIA. *See* **Pteris.**

LITSEA (from the Japanese name). SYN. *Tetranthera.* Including *Tetradenia.* ORD. *Laurineæ.* A large genus (upwards of 140 species have been described) of greenhouse or half-hardy trees, rarely shrubs, natives of tropical and Eastern Asia, from the Malayan Archipelago to Japan, tropical and sub-tropical Australia, New Zealand and New Caledonia, and (a few) North America. Flowers dicœcious, umbellate or capitate; involucres globose, pedicellate or sessile, disposed in sessile or shortly pedunculate fascicles, or in axillary or lateral racemes. Leaves alternate, few, or rarely almost opposite, penniveined or triplinerved. Few of the species are grown in this country. For culture, *see* **Laurus.**

L. geniculata (jointed). *fl.* yellow, polygamous, disposed in terminal, few-flowered umbels; pedicels short. May. *l.* deciduous, lanceolate, glabrous. Branches deep red, divaricately flexuous. *h.* 6ft. South United States, 1759. Half-hardy. SYN. *Laurus geniculata* (under which name it is figured in B. M. 1471).

L. glauca (glaucous). *fl.* whitish, as large as a hazel-nut, in dense branched clusters. Summer. *l.* lanceolate-oblong, acuminate, green above, silvery beneath. Japan. A handsome bush for cool conservatory decoration.

L. japonica (Japanese). *fl.* white; umbels fasciculated, shortly peduncled; involucre five to nine-flowered. *l.* rigid, coriaceous, oblong or oblong-lanceolate, glabrous or shining above, ferruginous or tomentose beneath. *h.* 3ft. Japan, 1843. Half-hardy. (S. Z. F. J. 87, 100.)

LITTÆA. This is now included, by Bentham and Hooker, as a section of *Agave.*

LITTONIA (named after Dr. S. Litton, once Professor of Botany at Dublin). ORD. *Liliaceæ.* A genus comprising only two species, one a native of Natal, and the other of Angola. Flowers orange, showy, nodding; pedicels short, solitary, axillary, ebracteate. Lower leaves ternate or quinate, sub-verticillate; upper ones sub-opposite or scattered, lanceolate, acuminate. Stems flexuous, simple, leafy. *L. modesta*—the only species yet introduced—is an elegant stove or greenhouse plant, very like *Gloriosa* in habit and general appearance. For culture, *see* **Gloriosa.**

FIG. 456. LITTONIA MODESTA, showing Top of Flowering Shoot and detached Flower.

L. modesta (modest).* *fl.* rich orange, bell-shaped, axillary. Early summer. *l.* bright shining green, terminated by a tendril. *h.* 2ft. to 6ft. South Africa, 1853. A pretty plant for growing against a pillar. See Fig. 456. (B. M. 4723.)

LITTORAL. Growing on the sea-shore.

LITUATE. Forked, with the points a little turned outwards.

LIVISTONA (named in honour of P. Murray, once of Livingston, near Edinburgh). SYN. *Saribus.* ORD. *Palmeæ.* A genus comprising fourteen species of very ornamental mostly stove palms, with unarmed stems, natives of Eastern tropical Asia, the Malayan Archipelago, New Guinea, and Eastern Australia. Flower-spikes branching, with several incomplete, leathery spathes. Leaves terminal, fan-shaped, divided into numerous segments, which are split at the apex, and frequently have threads hanging between them; footstalks sheathed at the base in a mass of netted fibres. The species thrive in a compost of two parts loam and one of peat, to which a little sand may be added. A liberal supply of water is needed throughout the summer. Several species are admirably adapted for various decorative purposes, and especially for sub-tropical gardening. Propagated by seeds, which should be sown in sandy soil, and placed in a gentle bottom heat.

L. altissima (very tall). *l.* bright shining green, fan-shaped, 1½ft. to 2ft. from top of petiole to margin, divided into segments about one-third of the way down, each segment bifid at the apex; petiole 2ft. to 6ft. long, the upper part green, base brown, inclosed in a reddish-brown network of woody fibres, and armed on each edge with stout and sharp recurved black spines. Java, 1868.

FIG. 457. LIVISTONA AUSTRALIS.

L. australis (Southern).* *l.* dark green, nearly circular, much plaited, divided round the edge into narrow plicate segments; petioles stout, dark brown, inclosed in a network of fibrous matter at the base, and armed at the edges with stout spines. *h.* 80ft. Eastern Australia, 1824. SYN. *Corypha australis.* See Fig. 457. (B. M. 6274.)

L. chinensis (Chinese).* *l.* large, over 5ft. broad, fan-shaped, with pendent marginal segments; petioles 4ft. to 5ft. long, rounded below, flat above; edges armed with short reflex spines, enveloped at the base in a network of brown fibrous tissue. *h.* 50ft. South China, 1818. A well-known and very handsome

Livistona—*continued.*

species, proving quite hardy in Cornwall, and nearly so in many less Southern districts. SYNS. *L. mauritiana* and *Latania borbonica*. See Fig. 458.

FIG. 458. LIVISTONA CHINENSIS.

L. Hoogendorpii (Hoogendorp's). *l.* rich dark green, forming a complete circle, much plaited, deeply divided; petioles stout, blackish-brown, inclosed in a network of reddish-brown fibres, and armed at the edges with long, stout, and sharp spines. Indian Archipelago, 1874. See Fig. 459.

FIG. 459. LIVISTONA HOOGENDORPII.

L. humilis (humble).* *l.* dark green, large, orbicular-cordate, spreading, deeply divided into narrow plicate segments, tapering to a fine point; petioles clothed at their edges with close-set spines. *h.* 6ft. to 30ft. Tropical Australia, 1824. A handsome species for decorative purposes, when young.

L. inermis (unarmed). A little-known plant, differing from *L. humilis* principally in having the petioles entirely without prickles. North Australia.

L. Jenkinsiana (Jenkins').* *l.* rich dark green, fan-shaped, 2ft. to 4ft. across, plaited; margin divided into somewhat broad segments; petioles from 2ft. to 10ft. in length, somewhat keeled below, flat above, armed at the edges with very stout, sharp spines, which are slightly recurved. *h.* 10ft. Assam and Sikkim, 1845. A beautiful greenhouse plant.

L. mauritiana (Mauritian). A synonym of *L. chinensis*.

L. olivæformis (Olive-formed). *l.* dark green, rather reniform than flabellate, 2ft. to 3ft. from top of petiole to the margin, divided into pendulous segments for about one-third of the length; petioles 2ft. to 4ft. long, stout, brown at the base, inclosed in a tissue of dark brown netted fibres, armed with a few small reddish spines. Java.

L. rotundifolia (round-leaved). *l.* dark green, with a suborbicular blade 3ft. to 5ft. in diameter, palmato-multifid, the elongate segments with bifid tips; petioles 6ft. to 7ft. long, margined with sharp spiny teeth. Stem 40ft. to 50ft. high. Malay Islands, &c. Pretty, in a young state, for stove decoration. See Fig. 460.

LLAVEA (named in honour of M. la Llave, the discoverer of the species). ORD. *Filices*. A monotypic genus, the species being a stove fern. It requires a compost of peat and sand, and plenty of drainage. *See also* **Ferns.**

L. cordifolia (cordate-leaved). *sti.* 1ft. long, strong, erect, fibrillose towards the base. *fronds* 1ft. to 2ft. long, 6in. to 12in. broad, tripinnate; the lower sterile, with stalked ovate segments, 1½in. to 2in. long, ½in. to ¾in. broad; the fertile segments of the upper part pod-like, 1½in. to 3in. long. *sori* linear, occupying the whole length of the changed pod-like segments of the upper part of the frond; involucre the same shape, rolled over, and quite concealing the sori. Mexico, 1853. SYN. *Ceratodactylis osmundioides*.

LLOYDIA (named after Mr. Edward Lloyd, who first discovered the plant in North Wales). SYNS. *Nectarobothrium, Rhabdocrinum*. ORD. *Liliaceæ*. A small genus (two species) of bulbous plants, one of which inhabits the mountains of Europe (Britain), Central and Northern Asia, and North America, and the other is limited to the Himalayas. Flowers white or yellow, pedicellate. Radical leaves one to three; cauline ones few, small. Stem low, slender, bearing one or two flowers at the apex. Bulb narrow. *L. serotina*—probably the only species known to cultivation—is a rare and pretty, bulbous-rooted, hardy perennial, requiring a dry, sandy loam. Propagated by offsets, or by the creeping shoots with a bulb at the extremity.

L. serotina (late-flowering). *fl.* white, erect, solitary, veined externally with green; perianth inferior, of six nearly equal, spreading, persistent segments. June. *l.* semi-cylindrical, those on the stem dilated at the base. Stem 5in. to 6in. high. Rocky ledges of Snowdon range, Wales; mountains and Arctic regions of Northern hemisphere. SYN. *Anthericum serotinum*. (Sy. En. B. 1521.)

LOASA (the native name in South America). Including *Illairea*. ORD. *Loaseæ*. Some of the plants formerly included here are now referred to *Blumenbachia*. A genus comprising about fifty species of hardy or greenhouse, annual or biennial, decumbent or twining herbs, beset with stinging hairs, natives of tropical America (except North Brazil and Guiana). Flowers yellow, brick-red, or whitish, often showy, axillary, solitary, racemose, or sub-paniculate; petals five, cucullate, equal, spreading, inserted in the top of the tube;

FIG. 460. LIVISTONA ROTUNDIFOLIA.

Loasa—*continued.*

scales five, inserted with the petals, furnished with three sterile filaments on the back of each, and girding two subulate appendages inside. Leaves alternate or opposite, entire, lobed, or decompound. Few species are in actual cultivation, and all are easily raised from seed, sown in a light, sandy soil, about May. It is however, generally preferable to sow it in pans, in March, and place in a gentle heat, transplanting outside about the latter part of April. Except where otherwise stated, the species described below are hardy.

L. acanthifolia (Acanthus-leaved). *fl.* yellow; pedicels axillary, and also from the forks, solitary, one-flowered. Summer. *l.* cordate at the base, pinnatifid; lobes acuminated, toothed. *h.* 4ft. Chili. Annual. SYN. *L. Placei.* (B. M. 3218.)

L. aurantiaca (orange). A synonym of *L. lateritia.*

L. canarinoides (Canarina-like). *fl.* dull brick-coloured; calyx of five sub-triangular sepals; petals erect or moderately spreading, ovate, shortly acuminate, gibbous at base, reticulately veined; peduncles solitary, opposite, axillary. Summer. *l.* opposite, rather long-stalked, cordate, cordate-oblong, or fiddle-shaped, pinnatifid, dentate, deeply veined. Stems herbaceous, 10ft. to 12ft. and more long, clothed with stinging hairs. Central America. Annual. A highly dangerous plant to the touch. (B. M. 5022, under name of *Illairea canarinoides.*)

L. hispida (bristly). *fl.* bright lemon-yellow, with the centre prettily variegated with green and white; blossoms 1in. across, produced in profusion. July. *l.* oblong, stalked, deeply cut, pinnatifid or almost pinnate, pubescent. *h.* 1½ft. Lima, 1830. A very pretty branching annual. (B. M. 3057.)

L. incana (hoary). *fl.* opposite the leaves, solitary, peduncled; corolla white, ten-parted, larger segments spreading, smaller ones concave; peduncles spreading, half the length of the leaves. October and November. *l.* scattered, petioled, spreading, ovate, acute, hispid on both sides, veins and midrib prominent below. Stem round, much-branched. *h.* 2½ft. Peru, 1820. Whole plant covered with barbed white hairs, with a few stinging ones interspersed. Greenhouse perennial. (B. M. 3048.)

L. lateritia (brick-red).* *fl.* brick-red, large; peduncles twin, one-flowered, terminal, about equal in length to the leaves. May. *l.* opposite, on long petioles, pinnate; segments roundish, crenated, lobed. Chili. A prostrate annual or biennial. SYNS. *L. aurantiaca* and *L. tricolor.*

L. nitida (shining). *fl.*, petals yellow, red at base, spreadingly reflexed; wings of the corona very small, toothed and stalked; pedicels axillary. June to September. *l.* cordate at the base, many-lobed; lobes acute, toothed, lower ones usually pinnatifid. Chili, 1822. A trailing annual. (B. M. 2372.)

L. Pentlandii (Pentland's).* *fl.*, corolla 2in. across when expanded, spreading, but not reflexed; petals ten, orange, scarcely clawed; peduncles 4in. long, axillary. May and June. *l.* opposite, petioled, sub-erect; lamina 4in. long, 1in. broad; petiole half the length of the lamina. *h.* 4ft. Peru, 1840. Annual. (B. M. 4095.)

L. picta (painted). *fl.* white, yellow; petals bidentate; racemes terminal, leafy. June and July. *l.* rhomboid-obovate, or lanceolate-acuminated, lobed, serrated, lower ones petiolate, upper ones sessile. *h.* 1ft. Andes of Peru, 1848. Plant erect, downy. Annual. (B. M. 4428.)

L. Placei (Place's). A synonym of *L. acanthifolia.*

L. prostrata (prostrate).* *fl.* yellow; peduncles axillary, one-flowered, about twice the length of the leaves. Summer. *l.* opposite, sessile, cordate-ovate, deeply angular. Stem prostrate, flexuous. Chili, 1879. Annual. (B. M. 6442.)

L. tricolor (three-coloured). A synonym of *L. lateritia.*

L. triloba (three-lobed). *fl.* yellow, small; pedicels axillary; scales petaloid, equally and bluntly three-lobed. Summer. *l.* cordate at the base, usually three-lobed; lobes acute, toothed; middle lobe usually again somewhat three-lobed. Chili, Peru. Annual.

L. vulcanica (volcanic).* *fl.* white, about 1½in. across, axillary, spreading, with five erect nectaries of a red colour, barred with transverse yellow and white stripes. Summer. *l.* palmately three to five-lobed; lobes cut. *h.* 2ft. Ecuador, 1877. Annual. SYN. *L. Wallisii.* (B. M. 6410.)

L. Wallisii (Wallis'). A synonym of *L. vulcanica.*

LOASEÆ. An order of erect or twining, rarely frutescent, herbs, with stinging hairs, natives (except *Fissenia*, which is African) of tropical and sub-tropical America. Flowers solitary, racemose or cymose, rarely capitate; peduncles often opposite the leaves; corolla white, yellow, or dull red. Leaves opposite or alternate, entire, lobed, inciso-pinnatifid, or two or three-pinnatifid. The species are of little economic value. About ten genera and 100 species are comprised in the order. Examples: *Gronovia, Loasa.*

LOBATE. Having lobes.

LOBE. The portion of a leaf the margin of which is deeply indented or divided, but so that the incisions do not reach the midrib or petiole.

LOBELIA (named after Matthias de L'Obel, 1538-1616, a botanist, and physician to James I.). SYN. *Rapuntium.* Including *Monopsis, Rhynchopetalum, Tupa,* &c. ORD. *Campanulaceæ.* A genus comprising about 200 species of greenhouse or hardy, annual or perennial, herbs and sub-shrubs, rarely shrubs, widely distributed over the tropical and sub-tropical regions of the globe, especially in America, but less abundantly found in Northern Europe and Asia. Flowers racemose; corolla irregular, tubular; tube cleft on the upper side, thickened or ventricose at the base; limb five-parted, bilabiate, the two segments of the upper lip linear-lanceolate, the lower lip trifid and pendulous; stamens epipetalous, anthers connate. Leaves alternate, usually sessile. Lobelias rank amongst the most popular and useful of garden plants. The dwarf-growing forms are indispensable in bedding arrangements, as their place could not be taken with equally good results by any other subjects in cultivation. Blue (a colour somewhat rare amongst bedding plants) is that which predominates in Lobelias; there are also varieties with pure white, white and blue, pink and white, and wholly pink flowers. Many of the tall-growing herbaceous perennial species are splendid summer and autumn-flowering plants, equally well suited for mixed borders or for grouping in flower beds. Various colours are represented, none being more beautiful and attractive than the species or varieties with rich deep crimson flowers.

Propagation. This may readily be effected either by seeds, by cuttings, or by divisions of the plants. Named or selected varieties should be propagated by one of the latter methods, as seedlings rarely perpetuate the character of the parent, except in the case of species. For bedding purposes, where the habit of Lobelias is not always of material importance, an easy plan of securing an annual stock of plants is to sow some seeds, about March, in well-drained pans of light soil, covering them very lightly on account of their small size, and placing the pans in a propagating house. The seedlings, when large enough, should be pricked off into other pans or boxes, and kept under glass until nearly bedding time in May. Stock plants of choice varieties for propagating should either be grown in pots, or be lifted from the open ground early in autumn, and preserved in a light greenhouse or frame through the winter, where plenty of air may be admitted on favourable occasions. Early in the year, the plants should be transferred to a propagating house, and, so soon as young growths can be obtained, the cuttings must be inserted in very light sandy soil. A large quantity may thus be obtained in a short time from a few stock plants, and the habit of all will be uniform afterwards, when growing in the open air. The tall species of Lobelia may also be raised from seeds. If these are sown when ripe, and placed in a cool frame, stronger plants may be secured for the following year than when sowing is deferred till spring. Cuttings of young shoots root readily in spring, and division of the plants at the same season is also a ready method for increasing the stock, either of species or varieties.

Cultivation. Dwarf tender forms of Lobelia prefer a rather light soil, wherein plenty of leaf mould has been incorporated. When planted in bedding arrangements, they should be kept well watered throughout the summer, in order to insure a continuous flowering habit. From 4in. to 6in. apart is about the proper distance, but seedling plants will usually cover more space than others obtained from cuttings. Half-hardy perennial species should be afforded a deep rich soil, as they well repay for liberal treatment by producing much more vigorous

× = Blumenbachia lateritia
see Vol. I Suppt

Lobelia—*continued.*

main flower-stems, and stronger side shoots, which also bear flowers in the autumn. Plenty of water will prove beneficial, and protection from rough wind must be provided by tying each plant to a suitable stake. When cut down by frosts, the roots may be lifted and stored in a cool frame all the winter, or they may be covered with a good depth of ashes or cocoa-nut fibre, and allowed to remain outside. The former plan is the safest, but care must be taken not to allow the roots to become too dry. Lobelias are also well adapted for culture in pots, for greenhouse decoration. They should be placed in a rich open soil, and be provided with manure water when beginning to flower.

L. amœna (pleasing). *fl.* pale blue; spikes secund, many-flowered. July and August. *l.* oblong-lanceolate, serrated, usually glabrous, 6in. to 8in. long, and 1in. broad. *h.* 1ft. to 4ft. North America, 1812. Hardy perennial. *L. colorata* (S. B. F. G. ser. ii. 180) is a garden hybrid of this species.

L. anceps (two-edged). *fl.* blue, with a white or yellowish throat; pedicels axillary, shorter than the bracts, which are linear, entire. June. *l.* obovate, toothed, superior ones dissimilar. Stems decumbent. Cape of Good Hope, 1820. Greenhouse herbaceous perennial. SYNS. *L. decumbens* (B. M. 2277), *L. rhizophyta* (B. M. 2519).

FIG. 461. FLOWERING STEM OF LOBELIA CARDINALIS.

L. cardinalis (cardinal).* Cardinal Flower. *fl.* scarlet; racemes terminal, unilateral, leafy. July and August. *l.* oblong-lanceolate, cartilaginously denticulated, and, as well as the stems, glabrous. *h.* 1ft. to 2ft. North America, 1626. A very stately and handsome herbaceous perennial. It is not perfectly hardy in our climate, but, if planted in spring, in deep rich loam, and in a situation fully exposed to the sun, it will flower well throughout the autumn, and, with protection, may be left in the ground all the winter. See Figs. 461 and 462. (B. M. 320.)

Lobelia—*continued.*

FIG. 462. LOBELIA CARDINALIS.

L. Cavanillesii (Cavanille's). A synonym of *L. laxiflora angustifolia.*

L. coronopifolia (Coronopus-leaved). *fl.* of a beautiful Gentiana-like blue; peduncles long, few-flowered. July and August. *l.* lanceolate, with three or more teeth on each side. Stem procumbent. Cape of Good Hope, 1752. Greenhouse herbaceous perennial. (B. M. 644.)

L. c. cærulea (blue). *fl.* purplish-blue, large, and drooping; peduncles three or four-flowered. Cape of Good Hope, 1824. (B. M. 2701.)

L. decumbens (decumbent). A synonym of *L. anceps.*

Fig. 463. FLOWERING BRANCH OF LOBELIA ERINUS.

L. Erinus (Erinus).* *fl.* blue, with a white or yellowish throat; peduncles axillary, solitary, much longer than the leaves. Summer. *l.* hairy at the base, toothed, lower ones obovate, petiolate; upper ones almost sessile, narrow-lanceolate. *h.* 6in. Cape of Good Hope, 1752. Greenhouse herbaceous perennial. (B. M. 901.) The varieties of this popular species are very numerous, and are separated into five sections, viz.: 1, *compacta*, neat and compact-growing, having both blue and white-

Lobelia—*continued.*

flowered forms; 2, *Paxtoniana*, much after the style of the *speciosa* group; 3, *pumila*, the dwarfest of all, including the forms known as *grandiflora* and *magnifica*; 4, *ramosoides*, rather tall-growing, attaining from 6in. to 9in. in height; 5, *speciosa*, a popular section, not quite so compact-growing as some of the others. There are double-flowered forms, but they are not extensively cultivated, on account of their uncertainty in growing and flowering satisfactorily.

L. Feuillei (Feuille's). A synonym of *L. Tupa.*

FIG. 464. LOBELIA FULGENS, showing Habit, and detached portion of Stem with fully opened and young Flower.

L. fulgens (shining).* *fl.* of a splendid scarlet colour, about 1in. long, downy outside; racemes terminal, leafy, somewhat secund. May to September. *l.* lanceolate, denticulated, with revolute margins, downy, as well as the stems, which are reddish. *h.* 1ft. to 2ft. Mexico, &c., 1809. A very handsome greenhouse or half-hardy herbaceous species, resembling *L. cardinalis*, but more downy; it requires similar treatment. See Fig. 464. (A. B. R. 659.) SYN. *L. ramosa* (B. ii. 93).

L. glandulosa (glandular). *fl.* blue; raceme or spike loosely few or many-flowered, secund. September. *l.* thick and smooth, bright green, lanceolate or linear, callous or glandular-denticulate. *h.* 1ft. to 4ft. South United States, 1840. Hardy herbaceous perennial.

L. glandulosa (glandular), of Lindley. A synonym of *L. syphilitica.*

L. gracilis (slender). *fl.* deep blue; upper lip of corolla densely bearded; racemes rather secund. Summer. *l.*, lower ones nearly ovate, deeply pinnatifid; superior ones linear-lanceolate, nearly entire. *h.* 2ft. New South Wales, 1801. Hardy annual. (A. B. R. 3406; B. M. 741.)

L. g. major (greater). A variety with larger flowers and more deeply toothed leaves. SYN. *L. trigonocaulis.* (B. M. 5088.)

L. heterophylla (variable-leaved), of Hooker. A synonym of *L. tenuior.*

L. hypocrateriformis (salver-shaped). A synonym of *Isotoma Brownii.*

L. ilicifolia (Ilex-leaved). *fl.* pink; corolla resupinate; pedicels axillary, solitary, much longer than the leaves. May to September. *l.* ovate-lanceolate, deeply and remotely toothed, glabrous. Barren stems prostrate, floriferous ones erect. *h.* 3in. to 6in. Cape of Good Hope, 1815. Greenhouse herbaceous perennial. (B. M. 1896.)

L. Kalmii (Kalm's). *fl.* blue; racemes loose, and mostly few-flowered, often leafy at base or panicled; pedicels equalling or longer than the flowers. July. *l.*, radical and lowest cauline ones oblanceolate or spathulate; upper ones linear, 1in. to 2in. long. *h.* 1ft. North America, 1820. Hardy herbaceous perennial. (B. M. 2238.)

L. Kraussii (Krauss's). *fl.*, corolla red, 1in. long, marcescent; tube compressed, spreading a little; calyx red, glabrous, persistent; peduncles 3in. long, axillary, solitary, numerous towards the top of the stem. January and February. *l.* 4½in. long, ¾in. broad, numerous, scattered, lanceolate, glabrous, shining green above, paler below, sharply serrated. *h.* 1ft. to 1½ft. Dominica, 1828. Greenhouse herbaceous perennial. (B. M. 3012.)

L. laxiflora (loose-flowered). *fl.* red, downy; tube nearly 1in. long; pedicels solitary, axillary, longer than the leaves, the whole forming a leafy raceme. June and July. *l.* ovate-lanceolate, acuminated, serrated, sessile. *h.* 3ft. Mexico, Central America, 1825. Greenhouse herbaceous perennial. (S. B. F. G. ser. ii. 389, under name of *Siphocampylus bicolor.*)

L. l. angustifolia (narrow-leaved) has narrower leaves and yellow flowers. (B. M. 3600, under name of *L. Cavanillesii.*)

L. longiflora (long-flowered). A synonym of *Isotoma longiflora.*

L. pedunculata (stalked). A synonym of *L. tomentosa.*

Lobelia—*continued.*

L. polyphylla (many-leaved). *fl.* solitary, axillary, often terminated with a crown of barren leaves; racemes terminal; corolla deep-blackish or blood-purple, curved. September. *l.* erecto-patent, coriaceous, oblong-lanceolate, acute, scarcely petiolate, of a bluish-green, and paler beneath, reticulated with veins, the sides often turned upwards. *h.* 4ft. Chili, 1835. Hardy herbaceous perennial. (B. M. 3550.)

L. puberula (puberulous). *fl.* blue, partly white, sometimes varying to white, mostly crowded, becoming horizontal on the short appressed pedicels. Summer. *l.* from ovate to oblong, mostly obtuse, pale or slightly hoary. *h.* 2ft. North America. Plant soft, pubescent with very short and fine hairiness. Hardy herbaceous perennial.

L. p. glabella (smoothish). A greener form, with slender, more glabrous, and usually more naked, virgate spike, glabrous calyx, &c., and flowers more secund. (B. M. 3292.)

L. pyramidalis (pyramidal). *fl.*, corolla purplish-violet; anthers deep blue, hairy; racemes panicled, leafy. Autumn. *l.* lanceolate, long-acuminated, serrated; upper ones linear, attenuated. Stem pyramidally branched. *h.* 3ft. to 4ft. Nepaul, 1822. Hardy herbaceous perennial. (B. M. 2387.)

L. ramosa (branched). A synonym of *L. fulgens.*

L. rhizophyta (creeping). A synonym of *L. anceps.*

L. robusta (thick-stemmed). *fl.* large, very numerous; corolla deep dull purple, falcate before the separation of the segments; raceme terminal, gradually elongated. August. *l.* numerous, scattered, crowded towards the apex, falling off below, obovate-lanceolate, acuminate, attenuated at base. Stem stout, erect, almost woody. *h.* 3ft. Hayti, 1830. Stove evergreen. (B. M. 3138.)

L. senecioides (Senecio-like). A synonym of *Isotoma axillaris.*

L. Speculum (conspicuous). *fl.* deep blue, with yellow anthers; peduncles very long, solitary, axillary, one-flowered, naked. Summer. *l.* linear-lanceolate, irregularly toothed or entire, alternate. Cape of Good Hope, 1812. Plant prostrate. Greenhouse annual. SYN. *Monopsis conspicua.* (A. B. R. 664; B. M. 1499.)

L. splendens (splendid).* *fl.* scarlet, glabrous, very like those of *L. cardinalis* and *L. fulgens*; racemes terminal, somewhat secund. May to September. *l.* lanceolate, denticulated, with flat margins. *h.* 1ft. to 2ft. Mexico, &c., 1814. Half-hardy herbaceous perennial. There is a variety, *atrosanguinea*, figured in B. M. 4002.

L. syphilitica (syphilitic).* *fl.* light blue, axillary, solitary, forming altogether a long, leafy raceme; corolla angular, with nearly equal segments. Autumn. *l.* ovate-oblong, acuminated at both ends, unequally serrated, sessile. *h.* 1ft. to 2ft. North America, 1665. Hardy herbaceous perennial. There are numerous hybrids between this species and some of the scarlet-flowered ones. (B. R. xxxii. 6, under name of *L. glandulosa.*)

L. tenuior (slender). *fl.* large, deep blue, with a white eye, the calyx-tube narrow; middle lobe of corolla broadly obovate; lateral ones also obovate, the two upper much smaller, incurved. September. *l.*, radical ones small, obovate, deeply toothed; cauline ones linear, lower ones pinnatifid, upper ones entire or toothed. Stems often 1ft. or more high, one or few-flowered. West Australia. Greenhouse herbaceous perennial. (B. M. 3784 and P. M. B. vi. 197, under name of *L. heterophylla.*)

L. thapsoidea (Mullein-like). *fl.* large, densely imbricated; corolla rose-purple, hairy or silky; raceme large, pyramidal; pedicels (especially the lower ones) reflexed when in flower. June. *l.* broadly lanceolate, attenuated below; lower ones 1ft. to 1½ft. long, all downy, dentato-ciliate. Stem erect, leafy, simple. *h.* 6ft. to 8ft. Organ Mountains, 1843. Greenhouse herbaceous perennial. (B. M. 4150.)

L. tomentosa (tomentose). *fl.* blue, with a purple tube, small; peduncles elongated, growing from the sides of the branches. October. *l.* petiolate, recurved, pinnatifid; pinnæ bifurcate, tomentose. *h.* 1ft. Cape of Good Hope, 1819. Greenhouse herbaceous perennial. (B. M. 2251, under name of *L. pedunculata.*)

L. trigonocaulis (three-angled-stemmed). A synonym of *L. gracilis major.*

L. Tupa (Tupa). *fl.*, corolla of a reddish-scarlet colour, large, and, as well as the peduncles and calyces, downy; racemes terminal, spicate. Autumn. *l.* ovate-lanceolate, sessile, decurrent, clothed with soft, whitish down. Stem erect, thick, suffruticose at the base, simple, leafy. *h.* 6ft. to 8ft. Chili, 1824. Half-hardy perennial, and said to be a very poisonous species. SYNS. *L. Feuillei* and *Tupa Feuillei.* (B. M. 2550.)

Varieties. In the bedding or dwarf section of Lobelias there are numerous named varieties, which, however, are frequently so near alike in colour as to be readily used as substitutes one for another. *L. speciosa* is an old type still largely grown, as it proves very useful for trailing over vases, &c. *L. pumila magnifica* is one of the very best blue varieties for any purpose. Cuttings must be inserted for preserving the compact habit of any named sort; seedlings will not perpetuate such characteristics. A list of other varieties is subjoined.

BLUE BEAUTY, deep blue, with small white eye, free-growing, and of good habit; FINSBURY PARK BLUE, bright blue self-coloured

Lobelia —*continued.*

flowers, very free; LUSTROUS, rich blue, fine white eye; OMEN, pink, small white eye, dwarf, and very distinct; PRINCESS OF WALES, pure white, very dwarf and floriferous; PUMILA GRANDIFLORA FLORE-PLENO, dark blue, a double-flowered form, sometimes grown, but does not always succeed well; PUMILA INGRAMI, white, slightly tinged with blue, of trailing habit; PUMILA MAGNIFICA, deep indigo-blue, small white eye, compact and floriferous habit throughout the season; SNOWBALL, white, dwarf compact habit, good; SWANLEY BLUE, light blue, rather vigorous habit.

LOBELIACEÆ. A tribe of *Campanulaceæ*.

LOBOSTEMON (from *lobos*, a lobe, and *stemon*, a stamen; in allusion to the stamens being inserted opposite the corolla lobes). SYN. *Echiopsis*. ORD. *Boragineæ*. A genus of greenhouse, scabrous-canescent or hispid, perennial herbs, sub-shrubs, or shrubs, confined to South Africa, allied to *Echium*. About fifty species have been enumerated, but many of these are not sufficiently distinguished to merit specific rank. Flowers white or bluish, in terminal cymes, sometimes densely capitate, sometimes in few scorpioid, somewhat elongated, loose branches; calyx segments five; corolla tubular-funnel-shaped, with five round, imbricated lobes. Nutlets four. Leaves alternate, sessile, granuloso-tuberculate or hispid, rarely almost glabrous. For culture, *see* **Echium.**

L. argenteus (silvery). *fl.* in spicate racemes; corolla blue; spikes terminal, simple, leafy. June. *l.* lanceolate, callous-acute, 1½in. to 2in. long. Stem shrubby, branched. *h.* 3ft. 1789. (A. B. R. 154, under name of *Echium argenteum*.)

L. ferocissimus (very fierce). *fl.* in spicate racemes; corolla blue; spikes simple, terminal, leafy. June. *l.* 1½in. to 2in. long, sessile, lanceolate. Stem shrubby, with prickly branches. *h.* 5ft. 1794. (A. B. R. 39, under name of *Echium ferocissimum*).

L. formosus (showy). *fl.* in sub-cymose, few-flowered racemes; corolla pink, tube twice as long as the calyx. June. *l.* narrow-lanceolate, papilloso-scabrous above, glabrous beneath; margin denticulate. Stem shrubby, with glabrous branches. *h.* 3ft. 1787. (A. B. R. 20 and B. R. 124, under name of *Echium grandiflorum*.)

L. fruticosus (shrubby). *fl.* in spicate racemes; corolla reddish at first, afterwards becoming blue; spikelets crowded. May. *l.* lanceolate or obovate-lanceolate, attenuated at base, silky-villous. Stem shrubby, branched. *h.* 3ft. 1759. (B. M. 1772 and B. R. 36, under name of *Echium fruticosum*.)

L. glaucophyllus (glaucous-leaved). *fl.*, corolla pale violet; spikelets bifid, bracteate. May. *l.* erect, lanceolate, acute, glabrous, glaucous; margins calloso-scabrous. Stem shrubby, branched, very glabrous. *h.* 2ft. 1792. (A. B. R. 165, under name of *Echium glaucophyllum*).

L. Swartzii (Swartz's). *fl.*, corolla blue; spikelets terminal, bi- or trifid, few-flowered. June. *l.* linear-lanceolate, acuminate, glabrous, callous-dotted on the margin and (rarely) beneath; young ones slightly hispid, ciliated. Stem shrubby, branched above, glabrous. *h.* 2ft. 1816.

LOCHERIA. Included under *Achimenes*.

LOCKHARTIA (named in honour of David Lockhart, a traveller, who introduced *L. elegans*). SYN. *Fernandezia*. ORD. *Orchideæ*. A genus comprising about half-a-score species of stove epiphytal orchids, inhabiting tropical America, from Brazil to the West Indies and Mexico. Flowers small and mediocre, rather long-stalked; sepals and petals sub-equal, free, spreading or laterally reflexed; lip free at base of column; column very short; peduncles in the upper axils, sometimes one or two-flowered, sometimes loosely but slenderly paniculate-branched. Stems fasciculate, erect, simple. Pseudo-bulbs none. The species are more interesting than ornamental. They should be grown on blocks, in a hot, damp stove.

L. acuta (acute). *fl.* yellow, red; lip linear, three-lobed, the lateral lobes parallel with the middle one; corymbs loosely many-flowered. June. *l.* acuminate, carinate. *h.* 6in. Trinidad, 1834. (B. R. 1806, under name of *Fernandezia acuta*.)

L. elegans (elegant). *fl.* peduncled, solitary, from the axil of one of the upper leaves; petals pale yellow, oblong-ovate; lip erect, yellow, spotted with red, thick and fleshy; peduncle slender, drooping. *l.* close-placed, distichous, equitant, ovate-oblong, very obtuse. Stems 3in. to 4in. high. Trinidad, 1827. (B. M. [illegible])

L. verrucosa (warted). *fl.* bright yellow, barred and spotted with red on the lower part of the lip; sepals oblong; lip longer and broader than the ovate petals. *l.* 1 in. long, keeled, sharp at the apex. Stems upright, closely imbricated, about 1ft high. (Guatemala, 1841. B. M. [illegible], under name of *Fernandezia robusta*.)

LOCULAR. Divided into cells.

LOCUST-TREE. The common name for the genus *Robinia*; also used for *Ceratonia Siliqua* and *Hymenæa*.

LODDIGESIA (named after Conrad Loddiges, founder of a once celebrated nursery at Hackney). ORD. *Leguminosæ*. A monotypic genus, the species being a greenhouse evergreen shrub, closely allied to *Hypocalyptus*. It requires sandy-peat soil, to which should be added a small quantity of loam. Propagated by cuttings, made in April, and inserted under a bell glass, in sandy soil.

L. oxalidifolia (Oxalis-leaved). *fl.* pinkish; keel dark purple at the apex; umbels three to eight-flowered. June. *l.* trifoliolate; leaflets obcordate, mucronate; stipules subulate. *h.* 1ft. to 3ft. Cape of Good Hope, 1802. Plant much-branched, smooth. (B. M. 965.)

LODOICEA (said to be altered from Laodicea, so called after Laodice, daughter of Priam). Coco de Mer: Double Cocoa-nut. ORD. *Palmeæ*. A monotypic genus, the species being a stove palm, very rarely seen in cultivation. It thrives best in a compost of rich loam and leaf mould, in equal parts. Thorough drainage, an abundant supply of water, and very strong heat, are essential elements to success in the culture of this plant. The seeds being very large, one of the chief difficulties in establishing this plant is its peculiar manner of germination; the radicle grows down in the form of a stout tap root for 3ft. or more, and, splitting open at the end, allows the plumule to ascend. If this long outgrowth be checked or injured in any way, success cannot be hoped for. The heavy seed can be kept on or in one pot, and the growing radicle allowed to push into another, keeping the whole dark until the development of the young plant, from which the seed should not be separated until the connection between the two falls naturally.

L. sechellarum (Seychelles). *fl.* produced on separate plants, both having three sepals and three petals. *fr.* very large, covered externally with a thick fibrous husk, and containing one, two, or even three immense stones or nuts, with very hard and thick black shells, each being divided half way down into two lobes. *l.* large, fan-shaped, sometimes 20ft. long, and 6ft. wide. Trunk nearly cylindrical, scarcely 1ft. in diameter, bearing a crown of leaves. *h.* 50ft. to 100ft. Seychelles Isles. The fruits of this plant average about 40lb. in weight. (B. M. 2734.)

LŒSELIA (named after John Lœsel, author of "Flora Prussica"). SYN. *Hoitzia*. ORD. *Polemoniaceæ*. A genus comprising six or seven species of slightly viscid, pubescent or glabrous, rigid, greenhouse under-shrubs or herbs, rarely small shrubs, natives of Mexico, Central America, and New Grenada. Flowers scarlet or violet, axillary, the upper ones often crowded at the apices of the branches; calyx five-cut; corolla funnel-shaped. Leaves alternate or opposite, undivided, often argutely toothed. The species thrive in a compost of fibry peat and sandy loam. Propagation may be effected by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in heat.

L. coccinea (scarlet). *fl.* solitary, on short peduncles; corolla scarlet. June. *l.* nearly sessile, ovate, acutely mucronate, cuneate at base, scabrous above, hairy beneath. *h.* 3ft. to 4ft. Mexico, 1824. Shrub.

L. glandulosa (glandular). *fl.* solitary, pedunculate; corolla red. June. *l.* ovate-lanceolate, petiolate, spiny-toothed; those on the branches nearly linear. Stem suffruticose, beset with glandular hairs. *h.* 2ft. Mexico, 1825.

LOGANIA (named after James Logan, 1674-1751, born in Ireland, afterwards Governor of Pennsylvania, a writer on botany). SYN. *Euosma*. ORD. *Loganiaceæ*. A genus comprising twenty-one species of greenhouse, glabrous herbs or sub-shrubs, rarely much-branched, tufted, or divaricate small shrubs. Three are natives of New Zealand, and the rest are confined to Australia. Flowers white or flesh-colour, often small; corolla campanulate, or tube cylindrical, sub-hypocrateriform; lobes five, rarely four, spreading; cymes terminal or axillary, sometimes loosely trichotomous, occasionally in a sessile head, sometimes reduced to a single flower. Leaves opposite, entire, connected by a raised stipular line or short sheath, or rarely with small setaceous stipules. Loganias require a well-drained compost of sandy loam and fibry peat. Propa-

Logania—*continued.*

gated, during summer, by nearly-ripened side shoots, placed in a sandy soil, under a bell glass. Probably the two species described below represent all introduced.

L. floribunda (bundle-flowered). *fl.* white; racemes axillary, compound, shorter than the leaves. April and May. *l.* lanceolate, attenuated at both ends, smooth; stipules lateral, setaceous. *h.* 2ft. to 3ft. Australia, 1797. (L. B. C. 1118; A. B. R. 520, under name of *Euosma albiflora*.)

L. latifolia (broad-leaved). *fl.* white, disposed in terminal panicles, composed of opposite, dichotomous, and trichotomous peduncles. Summer. *l.* obovate, acutish at both ends. *h.* 3ft. to 4ft. Australia, 1816.

LOGANIACEÆ. A natural order of herbs, shrubs, or trees, of variable habit, closely allied to *Rubiaceæ*. They inhabit chiefly warm and tropical countries. Flowers often red, white, purplish, or pale citron, rarely yellow, axillary and solitary, or racemose or corymbose, sometimes in a terminal corymb or panicle. Leaves opposite, stipulate, or exstipulate when the dilated and connate bases of the petioles embrace the stem, with a short, sometimes obsolete border. Stem woody, rarely herbaceous. Most Loganiaceæ have a very bitter juice. The species of *Strychnos* contain in the bark of their root, and in their seeds, two alkaloids, combined with a peculiar acid, the principles which are extremely energetic; their action on the nervous system is very powerful. There are about thirty genera and 350 species. Examples: *Gærtnera, Logania, Spigelia, Strychnos.*

LOGWOOD. *See* **Hæmatoxylon.**

LOISELEUREA (named after Loiseleur Deslongchamps, 1774-1849, a French botanist, who published a Flora of France, and other botanical works). SYNS. *Chamæcistus, Chamædon.* ORD. *Ericaceæ.* A monotypic genus, the species being a low-trailing evergreen shrub, well adapted for cultivating in rock-gardens, in a moist sandy-peat soil. Propagated by layers.

L. procumbens (trailing). *fl.* rose, small, in short, terminal clusters; corolla bell-shaped. July. *l.* about ¼in. long, opposite, revolute, smooth. Branches spreading and procumbent. Arctic and alpine regions of Northern hemisphere (Britain—only in the Scotch Highlands). SYN. *Azalea procumbens.* (Sy. En. B. 884.)

LOLIUM (the old Latin name, used by Virgil and Pliny). ORD. *Gramineæ.* A widely-dispersed genus of grasses. Upwards of twenty species have been described; these may probably (according to Bentham and Hooker) be reduced to two or three. They are of no value for horticultural purposes. The "tares" of Scripture are supposed to refer to the Darnel, *L. temulentum.* *L. italicum*, the Italian Rye Grass of agriculturists, is one of the numerous cultivated annual or biennial forms (not known in a wild state) of the common British *L. perenne.*

LOMAGRAMME PTEROIDES. According to Mr. Baker, this is an abnormal form of *Acrostichum Blumeanum*, with the sori in a line along the edge of pinnæ, rather narrower than the usual barren ones.

LOMARIA (from *loma*, an edge; referring to the position of the spores on the fronds). ORD. *Filices.* Including *Lomaridium, Lomariopsis.* A rather large genus (about fifty species) of handsome stove, greenhouse, or hardy ferns, of world-wide distribution, but having its head-quarters in the South temperate zone. Fronds dimorphous, usually once pinnatifid or pinnate, rarely simple or bipinnate. Sori linear, continuous, parallel with the midrib, and occupying the whole or nearly the whole of the space between it and the edge; involucre membranous, formed of the revolute edge of the frond. The species of this genus are, for the most part, unexcelled for the decoration of conservatories, dinner tables, &c. The large-growing species thrive best in a compost of loam and peat, to which may be added a small quantity of silver sand. The smaller sorts will require scarcely any loam. For general culture, *see* **Ferns.**

L. alpina (alpine).* *rhiz.* slender, wide-creeping, clothed with lanceolate ferruginous scales at the crown. *barren fronds* 4in. to 8in. long, ¼in. to ⅜in. broad, linear-lanceolate, with spreading, close-placed, linear-oblong, obtuse pinnæ, ⅛in. long, ⅛in. broad. *fertile fronds* on stipes 4in. to 12in. long; pinnæ narrower and more distant. Involucre slightly intramarginal. Brazil. A smaller plant than *L. Spicant*, with a slender, wide-creeping rhizome, and the pinnæ, especially of the fertile frond, broader and shorter. Half-hardy. See Fig. 465.

FIG. 465. LOMARIA ALPINA.

L. attenuata (narrowed).* *cau.* long, horizontal, stout, densely clothed at the apex with linear-subulate, light brown scales. *sti.* 4in. to 6in. long, erect, naked or slightly scaly below. *fronds* 1ft. to 3ft. long, 6in. to 9in. broad, ovate, narrowed very gradually downwards; barren pinnæ numerous, contiguous, spreading, linear, 3in. to 4in. long, ⅛in. to ¼in. broad, narrowed gradually towards the point, which is sometimes bluntly serrated, dilated on both sides at the base; fertile pinnæ as numerous, but only half to one line broad. Tropical America. A very beautiful and distinct stove species. SYN. *L. gigantea.*

L. Banksii (Banks'). *cau.* stout, woody, elongated, scaly upwards. *sti.* 3in. to 4in. long, erect, scaly below. *barren fronds* lanceolate, 6in. to 9in. long, about 1in. broad; pinnæ spreading, oblong, obtuse, ⅛in. to ¼in. long, ⅛in. broad, close-placed, passing gradually downwards into a short-stalked decurrent wing to the stem. *fertile fronds* smaller and more slender, pinnæ narrower and more distant. New Zealand. Greenhouse.

L. blechnoides (Blechnum-like).* *cau.* creeping. *barren fronds* short-stalked, lanceolate, about 6in. long, 1in. to 1½in. broad; upper pinnæ ⅜in. long, ⅛in. broad, dilated at the base, rather falcate, point blunt; lower ones narrowed gradually into mere auricles. *fertile fronds* 1ft. to 1½ft. long, 3in. broad. *sti.* 6in. long, strong, erect; pinnæ 1½in. to 2in. long, ⅛in. broad, dilated suddenly at the base, the upper ones ¼in. to ⅜in. apart. Chili. Very closely allied to *L. lanceolata*, but with larger fertile fronds, with pinnæ widened suddenly at the base on both sides. Greenhouse.

L. Boryana (Bory's).* *cau.* stout, erect, 1ft. to 2ft. high, woody, densely scaly. *sti.* stout, erect, 4in. to 6in. long. *barren fronds* ovate, 1ft. to 2ft. long, 6in. to 8in. broad; pinnæ close-placed, erecto-patent, lanceolate, narrowed gradually to the point, narrowed and sometimes auricled at the base, 3in. to 6in. long, ½in. or rather more broad. *fertile fronds*, pinnæ narrow, linear, rather close. Involucre brown, membranaceous, fimbriated, sometimes slightly intramarginal. West Indies to Falkland Islands, South Africa, &c. Greenhouse. SYN. *L. magellanica.* (H. G. F. 52.) *L. robusta* is a stout-growing form of this species, with densely scaly rachis.

L. B. cycadoides (Cycas-like). *trunk* stout, massive, furnished about the crown and base of stipes with a profusion of long black scales. *fronds* pinnate, coriaceous, 1ft. to 2ft. long; pinnæ large, lanceolate-oblong, blunt, deep green, the fertile ones linear-lanceolate, recurved at the apex. South-east Africa, 1875. Greenhouse.

L. B. Dalgairnsiæ (Miss Dalgairns'). *trunk* blackish, shaggy at apex, with long, subulate, dark brown scales. *fronds* subcoriaceous, lanceolate, pinnate; pinnæ lanceolate, acute, the terminal ones confluent, dark green above pale beneath. South Africa, 1877.

L. capensis (Cape). A form of *L. procera.*

L. chilensis (Chilian). A form of *L. procera.*

L. ciliata (fringed).* *cau.* 9in. high, 1½in. thick. *sti.* slightly scaly below. *fronds* not numerous, 8in. to 12in. long, ovate-oblong, simply pinnate; barren pinnæ linear-oblong, the lower ones distant and narrowed below, the upper more approximate, adnato-decurrent, with a broad rounded auricle at the base on the lower side, bluntish, frequently emarginate or bifid, margins lobed and spinuloso-ciliated; fertile pinnæ narrow-linear, decurrent, sometimes [illegible]. New Guinea, New South Wales, &c.

L. Colensoi [illegible]. A synonym of *L. [illegible].*

L. crenulata [illegible]. A synonym of *L. [illegible].*

L. Cumingiana (Cuming's). A synonym of *L. Patersoni.*

L. discolor (two-coloured).* *cau.* stout, ascending. *sti.* 3in. to 6in. long, strong, densely scaly at the base. *fronds* 1ft. to 3ft. long, the barren ones 4in. to 6in. broad, narrowed gradually at the base; pinnæ numerous, spreading, contiguous, linear, 2in. to 3in. long, ⅛in. broad, cut down very nearly to the rachis, narrowed suddenly towards the point, margin wavy, fertile pinnæ as numerous, but narrower and shorter. Australia, &c. Greenhouse.

Lomaria—*continued.*

L. d. nuda (naked). This variety differs from the type in its less coriaceous texture, castaneous stems, and more numerous, narrower, acuminate pinnæ.

L. dura (hard). *cau.* erect, sub-arborescent. *sti.* 1in. long, thick, erect, scaly at the base. *fronds* 1ft. or more long, lanceolate, cut down to the rachis below; barren pinnæ, the lower ones dwarfed into rounded lobes, the middle ones oblong sub-falcate, the upper ones narrower and more acuminated; fertile pinnæ shorter, crowded, broadish, very blunt, decurrent at the base above. Involucre transversely wrinkled, the margin fimbriated. Chatham Islands, 1866. Hardy. SYN. *L. rigida.*

L. elongata (elongated). A synonym of *L. Patersoni elongata.*

L. filiformis (filiform). *rhiz.* scandent, stout. *sti.* distant, 1in. to 4in. long. *barren fronds* ovate-lanceolate, 1ft. to 2ft. long, 3in. to 4in. broad; pinnæ numerous, spreading, linear, 2in. to 3in. long, ⅛in. broad, distinctly stalked, narrowed gradually towards the point and regularly crenato-dentate throughout; frond of the lower part of the caudex often much smaller, linear in general outline, 3in. to 4in. long, 1in. broad, with oblong, obtuse, sharply-toothed pinnæ. *fertile fronds* ovate, with numerous narrowly-linear pinnæ, 3in. to 4in. long. New Zealand, &c. Greenhouse. SYNS. *Lomariopsis heteromorpha* and *Stenochlæna heteromorpha.*

L. fluviatilis (floating). *cau.* 3in. to 4in. long, stout, scaly towards the crown. *sti.* 3in. to 4in. long, erect, densely scaly. *barren fronds* linear, 6in. to 18in. long, 1in. to 2in. broad; pinnæ oblong, obtuse, spreading, not decurrent, ¼in. to ⅔in. long, ⅛in. to ⅜in. broad, the upper ones nearly contiguous, the lower ones shorter and more distant. *fertile fronds*, pinnæ linear-obtuse, ½in. to ⅔in. long, ⅛in. broad, erecto-patent. New Zealand, &c. Greenhouse.

L. Fraseri (Fraser's).* *cau.* elongated, stout, sub-erect, densely clothed with linear scales at the crown. *sti.* 4in. to 6in. long, strong, erect, scaly. *fronds* ovate, acuminate, bipinnatifid, 1ft. to 1½ft. long, 4in. to 6in. broad; pinnæ linear-lanceolate, the lower ones 2in. to 3in. long, ½in. to ⅔in. broad, cut down very nearly to the rachis into linear-oblong, mucronate, slightly-toothed pinnules, their bases decurrent into a pinnatifid wing to the main rachis with triangular lobes; fertile frond similar in size and cutting. New Zealand, 1843. A very elegant greenhouse species, and quite distinct.

L. Germainii (Germain's). *cau.* elongated, scaly at the apex. *sti.* 1in. to 2in. long, erect, firm, scaly. *barren fronds* 2in. to 3in. long, ⅔in. to 1in. broad, oblong-lanceolate, with imbricated, spreading, linear-obtuse, crenate pinnæ, the largest ⅔in. long, ⅛in. broad, the lower ones distant, and narrowing down gradually to mere auricles. *fertile fronds* on longer stalks, with pinnæ nearly as broad and close as the others. Chili. Greenhouse. SYN. *L. crenulata.* (H. S. F. iii. 152.) Most like *L. alpina* in size and habit.

L. gibba (gibbous).* *cau.* 2ft. to 3ft. high. *sti.* short, strong, erect, densely scaly below. *fronds* 2ft. to 3ft. long, 6in. broad, both barren and fertile with very numerous erecto-patent pinnæ on each side, those of the former ¾in. to 1in. long, ⅛in. to ¼in. broad, cut down nearly to the rachis, dilated and connected at the base, the lower ones growing shorter very gradually, margin nearly entire, fertile pinnæ ½in. to 1in. long, ⅛in. broad. *sori* occupying the whole space between the edge and midrib. New Caledonia, &c., 1862. Stove or greenhouse. The variety known as *Billa* is a handsome form, producing long forked fronds, which are densely tasselled at the apex, as also are the points of all the pinnæ.

FIG. 466. LOMARIA GIBBA ROBUSTA.

L. g. robusta (robust).* A garden form, of more robust habit, and with broader pinnæ, than the type. See Fig. 466.

Lomaria—*continued.*

L. gigantea (gigantic). A synonym of *L. attenuata.*

L. Gilliesii (Gillies'). A synonym of *L. procera.*

L. lanceolata (lanceolate). *cau.* elongated, and densely clothed with dark brown, linear scales. *sti.* 4in. to 6in. long, firm, erect. *fronds* 6in. to 12in. long, 2in. to 4in. broad; the barren ones lanceolate, narrowed very gradually below; pinnæ close, slightly falcate, 1in. to 1½in. long, ¼in. to ⅜in. broad, gradually narrowed to a point or bluntish, slightly toothed; fertile pinnæ linear, spreading or falcate, about ⅛in. apart at the base. Australia, &c. A pretty greenhouse species.

L. L'Herminieri (L'Herminier's). *cau.* ultimately elongated, densely scaly. *sti.* 4in. to 6in. long, strong, erect. *barren fronds* ovate-lanceolate, 9in. to 15in. long, 3in. to 4in. broad; pinnæ dilated at the base, slightly falcate, 2in. or rather more long, ½in. broad, point bluntish, a few of the lower ones cut down suddenly into mere auricles; fertile pinnæ 2in. to 3in. long, ⅛in. broad; the lower ones ½in. to 1in. apart at the base. West Indies to Chili. Stove. (H. G. F. 40.)

L. magellanica (Magellan). A synonym of *L. Boryana.*

L. nigra (black).* *cau.* stout, clothed at the crown with linear scales. *sti.* slender, erect, densely scaly, 2in. to 3in. long. *barren fronds* 4in. to 6in. long, 1in. to 1½in. broad, linear-oblong, with a large, bluntish, sinuated point, cut down below to the rachis into numerous roundish-oblong, sinuated pinnæ on each side, which are ½in. to ⅔in. long, ¼in. to ⅓in. broad, the lower ones quite distinct, and a short distance from one another. *fertile fronds* with longer stalks, the terminal pinna long-linear, the lateral ones linear, erecto-patent. New Zealand. Greenhouse. (H. S. F. iii. 35.)

L. onocleoides (Onoclea-like). *rhiz.* long-scandent, densely scaly. *barren fronds* on stipes 3in. to 4in. long, lanceolate, 1ft. to 1½ft. long, 1in. to 2in. broad, narrowed very gradually below; pinnæ 1in. or less long, ¼in. to ⅜in. broad, lanceolate, dilated at the base, narrowed gradually towards the point. *fertile fronds* on stipes 4in. to 6in. long; pinnæ linear, 1in. to 1½in. long. Involucre broad, involute. West Indies, &c. Stove. (H. S. F. 146.)

L. Patersoni (Paterson's). *rhiz.* short-creeping. *sti.* 2in. to 3in. long, wiry, erect, rather scaly below. *barren fronds* about 1ft. long, under 1in. broad, broadest one-third of the distance from the top, narrowed very gradually downwards; point acuminate, margin cartilaginous and wavy. *fertile fronds* as long, but only ⅛in. broad. *sori* occupying the whole space between the midrib and margin. South Africa. A very pretty greenhouse species. SYN. *L. Cumingiana.* (H. S. F. 143.)

L. P. elongata (lengthened). A variety having both barren and fertile fronds pinnatifid, 2ft. or more long, the former cut down nearly to the rachis into six to nine pinnæ on each side, which are often 6in. to 9in. long, nearly 1in. broad, and suddenly decurrent at the base; the fertile pinnæ often numerous on each side, erecto-patent, 6in. long, ⅛in. broad. Neilgherries and Ceylon. Stove. SYNS. *L. Colensoi, L. elongata,* and *L. punctata.*

L. procera (tall).* *cau.* stout, woody, elongated, clothed with large scales. *sti.* 6in. to 12in. long, stout, erect, scaly below. *barren fronds* ovate, 1ft. to 3ft. long, 6in. to 12in. broad; pinnæ linear, 3in. to 12in. long, ½in. to 1in. broad, the lower ones stalked, base rounded or even cordate, sometimes auricled, point narrowed gradually. *fertile fronds* narrowly linear, distant, 4in. to 6in. long, ¼in. broad. Involucre broad, membranaceous, ciliated, sometimes slightly intramarginal. Mexico, West Indies, Australia, &c. Greenhouse. SYN. *L. Gilliesii.* (H. S. F. 53.) *L. capensis* and *L. chilensis* are large-growing forms.

L. p. ornifolia (Ash-leaved). *fronds* 3ft. long, with as many as forty pinnæ; the lower ones distinctly stalked, and often furnished with glands. SYN. *L. tuberculata.*

L. p. vestita (clothed). A form with densely paleaceous rachis. SYN. *L. vestita.*

L. pumila (dwarf).* *rhiz.* slender, creeping, clothed with bluntish scales at the apex. *fertile fronds* on stipes 3in. to 4in. long; pinnæ linear-oblong, with a considerable space between them. *barren fronds* lanceolate, 3in. to 4in. long, ½in. broad; pinnæ spreading, linear-oblong, obtuse, crenated, ¼in. long, ⅛in. broad. New Zealand. Half-hardy.

L. punctata (dotted). A synonym of *L. Patersoni elongata.*

L. punctulata (dotted). *cau.* stout, densely paleaceous at the crown. *sti.* 3in. to 6in. long, strong, erect. *barren fronds* oblong-lanceolate, 1ft. to 2ft. long, 4in. to 6in. broad; pinnæ very numerous, contiguous, linear, sub-falcate, 2in. to 3in. long, ¼in. to ⅔in. broad, rounded or cordate and auricled at base, lower ones deflexed, and the lowest reduced to auricles. *fertile fronds* similar, but pinnæ often not more than ⅛in. broad; rachis stout, erect, naked. South Africa, from Natal southward, and Java. Greenhouse.

L. rigida (rigid). A synonym of *L. dura.*

L. robusta (robust). A form of *L. Boryana.*

L. Spicant (spiked).* *rhiz.* stout, short-creeping. *barren fronds* on stalks 2in. to 3in. long, lanceolate, 6in. to 9in. long, 1in. to 1½in. broad, narrowed gradually below; pinnæ linear, ½in. to ⅔in. long, ⅛in. broad, bluntish or mucronate, slightly dilated at the base. *fertile fronds* often 1ft. long, 2in. broad, on stipes 6in. to 9in. long, narrowly linear; pinnæ ¼in. to ⅜in. apart, dilated at the base, the line of fructification at first slightly intramarginal. Northern hemisphere (Britain). Hardy. SYN. *Blechnum Spicant.*

Lomaria—*continued.*

L. S. anomala (anomalous). *fronds* about 9in. in height, thin, much attenuated; pinnæ all partially fertile, without being so much contracted as usual. Novel and distinct. A miniature form of this variety, known as *minus*, has been discovered in Wales, and makes a very pretty Wardian case subject.

L. S. concinna (neat). *barren fronds* prostrate, about 1ft. long, ½in. broad; lobes almost flabellate, beautifully crenulated round the margins, and somewhat imbricated. *fertile fronds* similar in outline, but erect. A very pretty variety.

L. S. contracta (contracted). *fronds* 4in. to 6in. long, very narrow; the lower portion resembles a deeply incised wing to the rachis; the upper portion pinnatifid, becoming again narrow at the apex. North Wales. A pretty Wardian case plant.

L. S. crispa (curled). A beautiful variety, having the lobes of the fronds beautifully undulated or curled and nearly always entire, and all the apices crested.

L. S. cristata (crested). A pretty form, differing from the type in the apex of each frond having a furcate crest.

L. S. flabellata (fan-shaped). *fronds* several times divided near the base, each division being beautifully ramose, and crested at the apex. A handsome variety.

L. S. imbricata (imbricated). *barren fronds* 6in. long, 2in. broad, ovate-lanceolate, the obtuse lobes densely imbricated. *fertile fronds* with the lobes somewhat narrower.

L. S. imbricato-erecta (erect-imbricate). *fronds* ligulate; pinnæ imbricate, turning back in the fertile fronds, so that their edges almost meet. A distinct form of the variety *flabellata*.

L. S. lancifolia (lance-leaved). *barren fronds* narrow, depauperated at the base, entire and ligulate towards the apex. *fertile fronds* about 9in. long, pinnatifid; pinnæ short and obtuse, the terminal one very much elongated.

L. S. multifurcata (much-forked). *fronds* 5in. to 10in. in height, nearly 2in. broad, the apex divided into several branches, forming a head upwards of 3in. across; pinnæ usually furcate; sterile fronds prostrate; fertile ones erect.

L. S. polydactyla (many-fingered). A handsome form, nearly as large as the type, and bearing a beautiful crest upon the apex of every frond.

L. S. serrato-rigida (rigid-toothed). *fronds* 9in. to 10in. high, pinnate, crested upon the ends; pinnæ distant, serrated on both margins. A rigid and erect variety.

L. S. serrulata (serrulated). *fronds* about 6in. high, very narrow-lanceolate; pinnæ short, and beautifully serrulate on the margins. Very pretty for Wardian case culture.

L. S. stricta (upright). *fronds* about 1ft. high, 1in. broad; lobes dentate, often slightly depauperated; fertile fronds much narrower than the sterile ones. A distinct variety.

FIG. 467. LOMARIA SPICANT TRINERVIS CORONANS.

L. S. trinervis (three-nerved). The main point of distinction in this variety occurs in the division of the frond into three sections near the base, the lateral ones being very small in comparison to the central one. A fine form of this variety—*coronans*—has the apices terminated with a large crest. See Fig. 467.

L. S. variabilis (variable). *fronds* 4in. to 5in. long, simple, entire, for a third of their length enlarging upwards, and then suddenly contracting; apex sometimes furcate.

L. tenuifolia (slender-fronded). A synonym of *Acrostichum tenuifolium*.

L. tuberculata (warted). A synonym of *L. procera ornifolia*.

L. vestita (clothed). A synonym of *L. procera vestita*.

L. vulcanica (volcanic). *cau.* thick, erect or sub-prostrate, densely clothed at the crown with subulate blackish scales. *sti.* 4in. to 6in. long, erect. *fronds* 6in. to 18in. long, 3in. to 6in. broad,

Lomaria—*continued.*

the barren ones ovate-lanceolate, not narrowed at the base or the lower pinnæ abbreviated; pinnæ spreading, lanceolate, 2in. to 4in. long, ¼in. to ⅜in. broad, base slightly dilated, point acute or bluntish, the lowest pair deflexed; fertile pinnæ linear, distant, dilated suddenly at the base, 2in. to 4in. long, ⅛in. broad. Java, New Zealand, &c. Stove or greenhouse.

LOMARIDIUM. Included under **Lomaria** (which *see*).

LOMARIOPSIS. Included under **Lomaria** (which *see*).

LOMATIA (from *loma*, *lomatos*, an edge; referring to the winged edge of the seeds). SYN. *Tricondylus*. ORD. *Proteaceæ*. This genus comprises about nine species of greenhouse or conservatory shrubs or trees, six of which inhabit Australia, and the rest are natives of Chili. Flowers hermaphrodite, in pedicellate pairs, in terminal or axillary, simple or slightly-branched racemes; perianth irregular. Leaves alternate or rarely opposite, toothed or pinnately divided, very variable on the same plant. Lomatias thrive in a compost of loam, peat, and sand, in equal proportions. Plenty of drainage is most essential. Propagated by cuttings of well-ripened shoots, placed in gentle heat, under a bell glass. The undermentioned are very elegant foliage plants:

L. ferruginea (rusty).* *l.* very dark green on the upper side, bipinnatifid; pinnæ somewhat ovate, trifid at the points; petiole and back of the leaf clothed with a short tomentum. *h.* 10ft. Chili, 1851. A handsome plant, of graceful habit.

L. ilicifolia (Holly-leaved). *fl.*, racemes long and loose, simple or slightly branched. *l.* petiolate, ovate, oblong, or lanceolate, irregularly prickly-toothed or lobed. *h.* 6ft. Australia. An erect branching shrub, growing sometimes into a small tree. (B. M. 4023.)

L. silaifolia (Silaus-leaved).* *fl.* white, in long, erect racemes. *l.* bright green above, bipinnatifid, smooth; pinnæ lanceolate, irregularly cut, acute; under surface slightly glaucous, the reticulated veins prominent. *h.* 2ft. New South Wales, 1792. A very desirable species, having a spreading habit. (B. M. 1272.)

L. tinctoria (dyer's). *fl.*, racemes terminal, or in the upper axils, pedunculate, loose, 4in. to 8in. long. *l.* pinnate, bipinnate, or rarely undivided; segments linear, obtuse, entire or lobed. *h.* 2ft. Australia. A small shrub. (B. M. 4110.)

LOMATOPHYLLUM (from *loma*, *lomatos*, a border, and *phyllon*, a leaf; alluding to the distinctly-bordered leaves). SYN. *Phylloma*. ORD. *Liliaceæ*. A very small genus (two or three species) of greenhouse succulent plants, allied to *Aloe*. Flowers at the sides of the branches, racemose, shortly pedicellate; panicles in the axils of the superior leaves, pedunculate. Fruit subglobose, fleshy-coriaceous. Leaves clustered at the apices of the stems, loriform-elongated, fleshy-coriaceous; margin cartilaginous, often coloured, calloso- or spinuloso-serrulate. Stem woody, simple, sometimes tall. The under-mentioned is the only species in cultivation. For culture, *see* **Aloe.**

FIG. 468. LONAS INODORA, showing Habit, and (1) detached Flower-head, (2) Leaf, and (3) Single Floret (page 296).

Lomatophyllum—*continued.*

L. aloiflorum (Aloe-flowered). Bourbon Aloe. *fl.*, corolla yellow, suffused with brownish-red on the outside, about ¾in. long, as large as a quill in diameter. June. *l.* smooth, about 3ft. long, 2in. to 3in. broad, clear green. Stem (in old specimens) about 8ft. high, and nearly as thick as a man's thigh. Bourbon, 1766. (B. M. 1585, under name of *Phylloma aloiflorum.*)

LONAS (derivation unknown). ORD. *Compositæ.* A monotypic genus, the species being a hardy, erect, branched, glabrous, annual herb. It thrives in any ordinary garden soil. Propagated by seeds, which may be sown in the open ground, in spring.

L. inodora (inodorous). *fl.-heads* yellow, small, in dense, terminal, crowded corymbs; involucre sub-turbinate-campanulate; receptacle elongated; achenes glabrous. July to October. *l.* alternate, deeply-toothed or cut. *h.* 1ft. Barbary, 1686. See Fig. 468, page 295. (B. M. 2276, under name of *Athanasia annua.*)

LONCHITIS (a name given by Dioscorides to one of the orchids, from *lonche*, a lance; alluding to the shape of the fronds) ORD. *Filices.* A genus comprising two species of stove ferns. Sori marginal, placed in the sinuses of the frond, more or less distinctly reniform, but often considerably elongated; involucre of the same shape as the sorus, and covering it, membranous in texture, formed from the reflexed margin. For general culture, *see* **Ferns.**

L. pubescens (pubescent). *sti.* 1ft. to 2ft. long, strong, erect, densely clothed with woolly pubescence. *fronds* 2ft. to 4ft. long, deltoid, tripinnatifid, cut down to the rachis except towards the apex; lower pinnæ sometimes 1ft. to 1½ft. long, 9in. to 12in. broad; pinnules lanceolate, cut down nearly to the rachis below, with blunt, oblong, sinuated segments. *sori* placed round the main sinuses of the pinnules, and in two or three of the hollows of the segments on each side. Mauritius. The following are forms or synonyms of this species: *glabra*, *Lindeniana*, *madagascariensis*, and *natalensis.*

LONCHOCARPUS (from *lonche*, a lance, and *karpos*, a fruit; in allusion to the shape of the pods). ORD. *Leguminosæ.* An extensive genus (about fifty species have been described) of tall climbing shrubs or trees, for the most part natives of tropical America, a few inhabiting tropical Africa, and one a native of Australia. Flowers violet-purple or white, in simple racemes, or rarely paniculate. Leaves alternate, impari-pinnate; leaflets opposite, rarely stipellate. In all probability, the species here described is the only one yet introduced. It is a stove evergreen tree, requiring a compost of turfy loam and fibry peat, with a small quantity of sand added, to ensure perfect drainage. Propagated, in May or June, by half-ripened cuttings, placed in sand, under a bell glass, in a gentle heat.

L. roseus (rose-coloured). *fl.* rose, large, showy; pedicels one-flowered; racemes erect. *l.*, leaflets thirteen to fifteen, lanceolate, acuminated, glabrous, shining above, rather pale beneath. *h.* 20ft. South America, 1700.

LONDON PRIDE. *See* **Saxifraga umbrosa.**

LONGCHAMPIA. This genus is now included under **Leyssera** (which *see*).

LONICERA (named after Adam Lonicer, or Lonitzer, 1528-1586, a German botanist). Honeysuckle. Including *Caprifolium* and *Xylosteum.* ORD. *Caprifoliaceæ.* An extensive genus (about eighty species have been enumerated) of hardy or half-hardy, erect or twining, deciduous or evergreen shrubs, natives of the temperate and sub-tropical regions of the Northern hemisphere, rarely seen in the tropics. Flowers often fragrant, axillary or capitate, variously disposed; corolla tubular, campanulate or funnel-shaped, with usually an irregular limb. Leaves simple, opposite, stipulate. Loniceras are amongst the most beautifully scented and popular of flowering shrubs. The tall-growing sorts are best suited for covering walls, arbours, and trellises of any description. *L. fragrantissima* and *L. Standishii* produce their flowers in the greatest profusion early in spring, on the wood made and ripened the previous year. Pruning must not, therefore, be practised with these until flowering is past, when all the shoots should be shortened back nearly close. Almost all the other species flower on young wood. *L. sempervirens*, and its variety, *minor*, are beautiful plants for training up greenhouse rafters. The majority of the Loniceras are of easy culture in any good garden soil. Propagated readily by cuttings, also by layers, and sometimes by seeds.

Lonicera—*continued.*

L. brachypoda (short-stalked). A synonym of *L. flexuosa.*

L. cærulea (blue-berried). *fl.* greenish-yellow, tubular; peduncles short, two-flowered, reflexed in the fructiferous state. March and April. *fr.* a dark blue, elliptic or globose berry, covered with a kind of bloom. *l.* oval-oblong, ciliated, stiffish, densely pubescent while young. *h.* 3ft. to 5ft. Northern hemisphere, 1629. Erect, deciduous. (B. M. 1965.)

FIG. 469. FLOWERING BRANCHLET OF LONICERA CAPRIFOLIUM.

L. Caprifolium (goat's-leaf).* *fl.* yellowish, with a bluish tube, 2in. long, highly fragrant, ringent, terminal, disposed in capitate whorls. May and June. *fr.* of a tawny-orange colour, elliptical. *l.* obovate, acutish, glaucous; uppermost ones broader and connate. Stem twining from left to right. Europe (naturalised in England, &c.). Deciduous. See Fig. 469. (Sy. En. B. 641.)

L. chinensis (Chinese). A synonym of *L. japonica.*

L. ciliata (ciliate). *fl.* yellowish, bilabiate; corolla funnel-formed, almost spurred at the base; lobes nearly equal. May. Berries red, separate. *l.* oblong-ovate, often heart-shaped, petioled, thin, downy beneath. North America, 1824.

L. dioica (diœcious). A synonym of *L. parviflora.*

L. diversifolia (different-leaved). A synonym of *L. quinquelocularis.*

L. Etrusca (Etruscan). *fl.* purplish on the outside, and yellow inside, fragrant, disposed in verticillate heads, usually about three heads on the top of each branch. May and June. *l.* obovate, obtuse, pubescent; lower ones on short petioles; upper ones connately perfoliate, acute. Branches twining. Europe. Deciduous.

L. flava (yellow).* *fl.* light yellow, fragrant, in approximate whorls; tube of the corolla somewhat gibbous. June. *l.* smooth, very pale and glaucous on both sides, thickish, obovate or oval, the

HYPERICUM OLYMPICUM.

Lonicera—*continued.*

two to four, upper pairs united into round cup-like disks. North America, 1810. Twiner. (B. M. 1318.)

FIG. 470. FLOWERING BRANCH AND DETACHED FLOWERS OF LONICERA FLEXUOSA.

L. flexuosa (flexuous-stemmed).* *fl.* yellow, axillary, few, almost sessile, very fragrant. June and July. *fr.* globose, glabrous. *l.* ovate-oblong, acute, on short petioles, glabrous. Stems flexuous. *h.* 4ft. to 5ft. Japan, 1806. Deciduous twiner. SYN. *L. brachypoda.* See Fig. 470.

L. f. aurea-reticulata (golden-reticulated). *l.* beautifully netted or variegated with yellow, with a mixture of red towards autumn. An elegant plant.

L. fragrantissima (very fragrant).* *fl.* white, very fragrant, nearly 1in. across, produced before the leaves are developed; tube short; mouth expanded. February. *l.* oblong-obovate, acute, rounded at the base, nearly glabrous. *h.* 6ft. China, 1845. This most desirable erect evergreen species is one of the best fragrant winter-flowering plants cultivated. (L. & P. F. G. 3, 75, 268.) Closely allied to this species is *L. Standishii*, which has ovate-oblong, or ovate-lanceolate, ciliate leaves, and retrorsely hairy peduncles; in other respects, it is similar to *L. fragrantissima*, and is by no means inferior. (B. M. 5709.)

L. glauca (glaucous-leaved). *fl.* yellow; corolla long, tubular; tube slender; peduncles short; ovary free. July. *fr.*, berries globose. *l.* linear-oblong, obtuse; margins scaberulous, recurved, glaucous underneath. Western Himalayas. A dwarf, densely branched, wiry undershrub.

L. hirsuta (hairy). *fl.* yellow; spikes or racemes composed of verticillate heads of flowers; corolla beset with glandular pubescence. June and July. *l.* broad, ovate-elliptic, on short petioles, pubescent and ciliated, glaucous beneath; upper ones connately perfoliate. Branches twining. North America, 1822. Deciduous. SYNS. *Caprifolium hirsutum* and *L. pubescens.* (B. M. 3103.)

L. implexa (interwoven). *fl.* red, yellow, capitate, terminal. June to September. *l.* evergreen, leathery, oblong, entire, shining above, glaucous beneath. Plant glabrous. *h.* 8ft. Europe, 1772. Twiner. (B. M. 640.)

L. involucrata (involucrate). *fl.* yellow, tinged with red, viscid; peduncles axillary, two or three-flowered. June. *l.* ovate or oblong, somewhat acuminated, stiff, pubescent, tomentose on the nerves. Branches elongated, acutely tetragonal. *h.* 2ft. to 3ft. California, 1833. An erect species. SYN. *L. Ledebourii.* (B. R. 1179.)

L. japonica (Japanese). *fl.* red, villous on the outside and white within, about 1in. long, fragrant, twin. July to September. *l.* petiolate, ovate, acutish, villous, pale beneath; upper ones the smallest. Branchlets opposite, very hairy, bearing two leaves and two sessile flowers at the top of each. Stem twining, flexuous, hairy. Japan and China, 1806. (B. M. 3316, under name of *L. chinensis.*)

L. Ledebourii (Ledebour's). A synonym of *L. involucrata.*

L. longiflora (long-flowered). *fl.* at first snow-white, but finally changing to a golden-yellow, several inches long; peduncles short, two-flowered. July to September. *l.* petiolate, oblong-lanceolate, shining above and pale beneath. Branches twining. China, &c., 1826. Deciduous. (B. R. 1232, under name of *Caprifolium longiflorum.*)

L. parviflora (small-flowered). *fl.* in two or three closely approximate whorl, raised on a peduncle; corolla greenish-yellow, tinged with dull purple, gibbous at the base, smooth outside. May and June. *l.* smooth, oblong, green above, very glaucous beneath, the upper pairs united, all closely sessile. North America. Deciduous twiner. (B. R. 138, under name of *L. dioica.*)

Lonicera—*continued.*

L. p. Douglasii (Douglas's). *fl.*, corolla crimson or deep purple. *l.* greener than in the type, more or less downy underneath when young, or ciliate. North America.

L. Periclymenum (Periclymenum)*. Woodbine, or Common Honeysuckle. *fl.* externally deep red, ringent, disposed in heads, all of which are terminal, ovate, and imbricated. Spring to autumn. *fr.* nearly globular, deep red, bitter and nauseous, accompanied by permanent bracts. *l.* ovate, obtuse, attenuated at the base, sometimes downy, glaucous. Branches climbing. Europe, &c. (Britain). Deciduous. (Sy. En. B. 642.) There are several varieties of this well-known shrub.

L. pubescens (downy). A synonym of *L. hirsuta.*

L. punicea (scarlet-flowered). *fl.* deep red or crimson; peduncles axillary and almost terminal, two-flowered, shorter than the leaves; tube of corolla rather gibbous at the base; segments unequal. April and May. *l.* ovate, sub-cordate at the base, sometimes three in a whorl on the young shoots. *h.* 2ft. to 4ft. Native country unknown, 1825. Erect. SYN. *Symphoricarpos puniceus.* (B. M. 2469.)

L. quinquelocularis (five-celled). *fl.* yellow, twin, sessile, axillary; lower lobe of corolla linear, recurved, trident; upper cordate. June and July. *l.* ovate, acute. *h.* 4ft. North India, 1840. Plant downy, erect. (B. R. 1844, 33, under name of *L. diversifolia.*)

FIG. 471. FLOWERING BRANCHLET OF LONICERA SEMPERVIRENS.

L. sempervirens (evergreen).* *fl.* of a beautiful scarlet outside and yellow inside, about 1in. long; spikes nearly naked, composed of whorls; tube of corolla ventricose on the upper side. Spring and summer. *l.* obovate or ovate, glaucous beneath, glabrous; upper ones connately perfoliate. Branches twining. North America, 1656. See Fig. 471. (B. M 781.) This evergreen species is the most handsome of all the cultivated Honeysuckles; it is best grown in a cool greenhouse. There is a very desirable variety, *minor.* (B. M. 1753.)

L. tatarica (Tartarian).* *fl.* rose-coloured, short, somewhat gibbous at the base; peduncles two-flowered, shorter than the leaves. April and May. *fr.* black, nearly globose when young, but at length connate at the base. *l.* cordate-ovate, hardly acute. *h.* 4ft. to 6ft. Tartary, 1752. Erect, deciduous. (B. R. 31.) There are several varieties of this species, differing principally in the colour of the flowers.

L. tomentella (slightly downy). *fl.*, corolla white, scarcely ½in. long; mouth equal; lobes short; throat villous. July. *fr.*, berry black. *l.* linear-oblong or lanceolate, obtuse or acute. Branches distichous, upright. *h.* 10ft. to 12ft. Sikkim-Himalayas, 1849. (B. M. 6486.)

L. Xylosteum (Xylosteum). Fly Honeysuckle. *fl.* cream-coloured, downy, small; peduncles two-flowered, shorter than the leaves. July. *fr.* oval, scarlet, one-celled, six-seeded. *l.* ovate, acute, petiolate, soft. *h.* 4ft. to 5ft. England. An erect deciduous shrub, of little beauty. SYN. *Xylosteum dumetorum.* (F. D. 808; Sy. En. B. 916.)

LONICEREÆ. A tribe of *Caprifoliaceæ.*

LOOKING-GLASS TREE. *See* **Heritiera.**

LOOSESTRIFE. *See* **Lysimachia** and **Lythrum.**

LOPADOCALYX. A synonym of **Olax** (which *see*).

LOPEZIA (named in honour of Thomas Lopez, a Spanish botanist, who wrote on the botany of America). SYN. *Pisaura.* ORD. *Onagrarieæ.* A genus (about twenty species have been described) of stove, greenhouse, or hardy erect annual herbs inhabiting Mexico and Guatemala. Flowers often small, racemose or subcorymbose, at the apices of the branches, remarkable in having but one antheriferous stamen and one petaloid. Leaves alternate, petiolate, lanceolate-acuminate, unequally serrate. Lopezias are of easy culture in a light soil. Propagated by seeds, sown on a slight hotbed, in the middle of March; the seedlings being transplanted to the open in the latter part of May.

L. coronata (crowned).* *fl.* rose-purple; petals reflexed, deeper coloured towards the base; racemes terminating the branches. July to September. *l.* alternate, ovate, serrated, attenuated at the base. *h.* 1½ft. Mexico, 1804. Hardy. (A. B. R. 551.)

L. grandiflora (large-flowered). *fl.* orange-red, disposed in close racemes; sepals erecto-patent; petals sessile. August. *l.* lanceolate, or ovate-acute, serrate, shortly stalked. *h.* 3ft. Mexico, 1879. Half-hardy.

L. macrophylla (large-leaved).* *fl.* bright red, large; calyx segments erecto-patent, lanceolate, broader at base; petals, two narrower and longer than calyx, geniculated at base, two broader and shorter; peduncles axillary, solitary, one-flowered. March. *l.* opposite, on long petioles, ovate-acuminate, serrated, slightly hairy and ciliated. Branches green and succulent. Mexico. A small half-shrubby greenhouse plant. (B. M. 4724.)

LOPHANTHUS (from *lophos*, a crest, and *anthos*, a flower; in allusion to the crenated or crested middle lobe of lower lip of corolla). Giant Hyssop. ORD. *Labiatæ.* A genus comprising six species of hardy or half-hardy erect herbs, with the habit of *Nepeta*, natives of North America and extra-tropical Eastern Asia. Corolla blue or purplish; tube as long as the calyx, or shortly exserted; limb two-lipped; whorls many-flowered, sometimes densely crowded in terminal spikes, sometimes in axillary cymes. Nutlets ovoid, smooth. Leaves toothed; floral ones often reduced to short ovate and acuminate bracts. The undermentioned species are hardy perennials, and grow well in ordinary soil. Propagated by divisions. All the plants here described are North American.

L. anisatus (Anise-scented).* Anise Hyssop. *fl.* blue; calyx teeth lanceolate, acute. July. *l.* ovate, acute, glaucous, white with minute down underneath, scented like Anise. *h.* 3ft. 1826. (B. R. 1282.)

L. nepetoides (Nepeta-like). *fl.*, corolla pale greenish-yellow; calyx teeth ovate, rather obtuse, little shorter than the corolla; spikes 2in. to 6in. long, crowded with bracts. July. *l.* ovate, somewhat pointed, coarsely crenate-toothed, 2in. to 4in. long. Stem stout, 4ft. to 6ft. high, sharply four-angled. 1692.

L. scrophulariæfolius (Figwort-leaved).* *fl.*, corolla purplish; calyx teeth lanceolate, acute, shorter than the corolla; spikes 4in. to 15in. long. July. *l.* ovate or somewhat cordate, acute; lower surface, as well as the stem, more or less pubescent. *h.* 5ft. 1800.

L. urticifolius (Urtica-leaved). *fl.* purplish, or white and pink, with much exserted stamens; spikes dense, oblong, 2in. to 3in. long. Late summer. *l.* cordate-ovate, crenated, stalked. Stem square, branched. *h.* 3ft. to 4ft. 1826.

LOPHIDIUM. *See* **Schizea.**

LOPHIOLA (a diminutive name, deduced from *lophos*, a crest; referring to the crested sepals). ORD. *Hæmodoraceæ.* A monotypic genus, the species being a pretty, slender, hardy, herbaceous perennial, requiring peaty soil, and a rather damp, shady situation. Propagated by divisions of the root, in autumn or spring.

L. aurea (golden). *fl.* yellow, densely woolly on the outside, disposed in a crowded cyme at the top of a naked scape; perianth deeply six-cleft, with spreading divisions. June. *l.* narrow-equitant, radical. *h.* 1½ft. North America, 1811. (B. M. 1596.)

LOPHIRA (from *lophos*, a crest, and *eiro*, to arrange; in reference to one of the sepals being extended out into a ligulate wing or crest). ORD. *Dipterocarpeæ.* A monotypic genus, the species being a handsome stove pyramidal tree. It requires a compost of sandy loam and fibry peat. Firm young cuttings will root in sand, in a gentle bottom heat.

Lophira—*continued.*

L. africana (African). Scrubby Oak. *fl.* yellow, in terminal and axillary racemes. February. *fr.* one-celled, indehiscent, fleshy, soft. *l.* elongated, entire, often undulated, emarginate, leathery, pale green; stipules caducous. *h.* 10ft. Tropical Western Africa, 1822.

LOPHOLEPIS. *See* **Polypodium.**

LOPHOSORUS. Included under *Alsophila.*

LOPHOSPERMUM. Included under **Maurandia** (which *see*).

LOPHYRUS (*Pine Sawflies*). A genus of Sawflies, the larvæ of which feed on Fir, Spruce, Larch, and other conifers. Several species are known to occur in Britain. At times, the larvæ do extensive damage, as they are of social habit, and eat away the needles, so that they leave branches, or even whole trees, bare; they may thus destroy entire plantations. They are seldom hurtful in gardens, however, being restricted to conifers, and do not need to be described at length in this work. Owing to their living and feeding in society, their presence is easily detected, and hand-picking will, in almost all cases, be found an effectual remedy, should they attack conifers in gardens or in pleasure grounds.

LOPIMIA. Now included under **Pavonia** (which *see*).

LOQUAT, or JAPAN QUINCE. *See* **Photinia japonica.**

LORANTHACEÆ. An order of evergreen shrubs, parasitic on the wood of other Dicotyledons, sometimes appearing epiphytal, and emitting roots, which creep over the branches of the infested tree. Flowers sometimes imperfect, small, inconspicuous, whitish or greenish; sometimes perfect, brightly coloured, variously arranged. Leaves opposite, rarely alternate or whorled, thick, coriaceous, entire. Loranthaceæ are mostly tropical, but some inhabit temperate and cool regions of the Northern and Southern temperate latitudes. The fruit of this order contains Birdlime, a peculiar viscous, tenacious, and elastic substance. Mistletoe (*Viscum album*) was formerly worshipped by the Gauls; it was also held sacred by the Druids. There are about thirteen genera and 500 species. Examples: *Loranthus, Viscum.*

LORATE. Shaped like a thong or strap.

LORD ANSON'S PEA. *See* **Lathyrus magellanicus.**

LORD HARRINGTON'S YEW. *See* **Cephalotaxus pedunculata.**

LORDS AND LADIES. *See* **Arum maculatum.**

LOREYA (named after M. Lorey, a French botanist, author of a Flora of Burgundy, published in 1825). ORD. *Melastomaceæ.* A small genus (about eight species have been described) of ornamental, glabrous or tomentose, stove trees, natives of Northern Brazil and Guiana. Flowers in cymose panicles. Fruit inferior, baccate. Leaves large, stalked, ovate, entire. Branches four-sided. Probably the species here described is the only one yet introduced. For culture, *see* **Melastoma.**

L. arborescens (Tree-like). *fl.* white, lateral; racemules seven to eight-flowered, cymose. July. *fr.*, berry yellow, edible, very like a medlar. *l.* petiolate, oval-orbicular, obtuse, or mucronate. *h.* 30ft. Guiana, 1822.

LORINSERIA. *See* **Woodwardia.**

LOROPETALUM (from *loron*, a thong, and *petalon*, a petal; referring to the long thong-like petals). ORD. *Hamamelideæ.* A monotypic genus, the species being a very ornamental, free-flowering, hardy, stellate-tomentose shrub, or small tree. It thrives in any light rich soil. Propagated by seeds, or by cuttings.

L. chinense (Chinese). *fl.* white, small, disposed in terminal, crowded, six to eight-flowered heads; petals four, linear-elongated. Autumn. *l.* dark green, alternate, persistent, oblong, entire, nerved beneath; stipules membranaceous, deciduous. *h.* 4ft. Khasia Mountains and China, 1880.

LOTUS (from *Lotos*, the old Greek name given by Theophrastus and Dioscorides to some leguminous plants). Bird's-foot Trefoil. Including *Pedrosia* and *Tetragonolobus*. ORD. *Leguminosæ*. A large genus (about 100 species have been described, although not more than fifty have any claim to specific rank) of greenhouse or hardy herbs or sub-shrubs, widely dispersed over the temperate regions of the Northern hemisphere in the Old World, the mountains of tropical Asia, and extra-tropical South Africa. Flowers yellow, red, purple, pink, or white, usually several together in an umbel, on an axillary peduncle. Leaves four or five-folioiate; leaflets entire. But few species are worth growing, and these are of very easy culture in almost any ordinary garden soil. *L. jacobæus* is a greenhouse sub-shrubby plant, but it is very liable to die off in winter. It can be increased, during early summer, by cuttings, placed in an airy situation, and kept carefully watered. The species can also be raised annually from seeds, which are ripened freely in this country. *L. gebelia* and *L. jacobæus* would probably prove hardy in the open air, if planted in a warm, sheltered spot.

L. albidus (whitish). A synonym of *L. australis*.

L. australis (Southern).* *fl.* usually pink, but varying from white to a purple-red. July. *l.*, leaflets narrower than in *L. corniculatus*, and the stipulary ones dissimilar, but varying from obovate to linear. Stems diffuse, ascending, or erect. *h.* 2ft. Australia. Greenhouse perennial. (B. M. 1353.) SYN. *L. albidus* (L. B. C. 1063).

L. corniculatus (small-horned).* Common Bird's-foot Trefoil. *fl.* bright yellow, fading to an orange-colour; vexillum striped with red at the base in front; peduncles very long, each bearing three, four, five, or ten flowers at the apex in a kind of flat umbel. Summer and autumn. *l.*, leaflets obovate, acute, entire; stipules ovate. Northern hemisphere (Britain). Plant procumbent. A very handsome dwarf herbaceous plant, well suited for growing on a rockwork. (Sy. En. B. 368.) The double-flowered form is very desirable.

L. gebelia (Gebel-cher).* *fl.* at first red, but ultimately pale rose, large; heads of long peduncles usually three-flowered. June and July. *l.*, leaflets and stipules ovate, rather glaucescent. Stems decumbent. Asia Minor, 1816. Greenhouse perennial.

FIG. 472. LOTUS JACOBÆUS, showing Flowering Branch, detached Portion of Stem, with Leaf and Flowers (natural size), and Pods.

L. jacobæus (St. Jago).* *fl.* dark purple, almost black, with the vexillum yellowish, corymbose; peduncles longer than the leaves. Summer and autumn. *l.*, leaflets and stipules [illegible] linear spathulate, rather pilose and canescent, [illegible]. *h.* 1ft. to 3ft. Cape Verde Islands. Greenhouse perennial. See Fig. 472. (B. M. [illegible])

L. peliorhynchus (pigeon's-beak).* *fl.* loosely crowded on short shoots towards the ends of the branches, corolla scarlet, 1in. long, with a very narrow-lanceolate standard, sharply recurved, like a hood. May. *l.* crowded, sessile, having subulate, spreading leaflets (as if fascicled). *h.* 2ft. Teneriffe, 1884. A [illegible] and ornamental greenhouse shrub. (B. M. 6733.)

L. pinnatus (pinnate). A synonym of *[illegible]*.

L. Tetragonolobus (Tetragonolobus). *fl.* dark purple, solitary or twin; bracts longer than the calyx. June to August. *l.*, leaflets obovate, entire; stipules ovate. *h.* 6in. to 12in. South Europe. Hardy annual. SYN. *[illegible]*. (B. M. [illegible])

LOTUS-TREE, EUROPEAN. *See* **Diospyros Lotus.**

LOTZEA. Included under *Asplenium*.

LOUSEWORT. *See* **Pedicularis.**

LOVAGE. *See* **Ligusticum scoticum.**

LOVE APPLE. *See* **Lycopersicum.**

LOVE GRASS. *See* **Eragrostis.**

LOVE-IN-A-MIST. *See* **Nigella damascena, N. sativa,** &c.

LOVE-IN-IDLENESS. *See* **Viola tricolor.**

LOVE - LIES - BLEEDING. *See* **Amaranthus caudatus.**

LOVE-TREE. *See* **Cercis Siliquastrum.**

LOWEA. Included under **Rosa** (which *see*).

LOXANTHES. A synonym of **Nerine** (which *see*).

LOXOCOCCUS (from *loxos*, oblique, and *kokkos*, a berry; fruit oblique). ORD. *Palmeæ*. A monotypic genus, the species being an elegant stove palm, which flowered, for the first time in England, at Kew, in the spring of 1878. For culture, *see* **Areca.**

L. rupicola (rock-loving).* [illegible] produced from the upper part of the stem beneath the leaves. *l.* pinnate, spreading, 5ft. to 6ft. long, 3ft. [illegible] broad; petioles 1½ft. long, with a green, smooth, shortly [illegible] caul base; pinnules from twelve to twenty pairs, spreading, and somewhat recurved. *h.* 30ft. to 40ft. Ceylon, 1878. SYN. *Ptychosperma rupicola*. (B. M. 6358.)

LOXOSCAPHE. Included under **Davallia** (which *see*).

LOXSOMA (from *loxos*, oblique, and *soma*, a body; the sporangia are girt by an incomplete ring). ORD. *Filices*. A monotypic genus, the species being a remarkable and rare greenhouse fern. For culture, *see* **Ferns.**

L. Cunninghami (Cunningham's). [illegible] New Zealand. (H. G. F. 31.)

LUBINIA. Included under **Lysimachia** (which *see*).

LUCANUS CERVUS, or STAG BEETLE. This is the largest of British beetles, and the male (see Fig. 473) is so strikingly distinguished by the enormously developed jaws, that it could not be mistaken for any other insect. Large individuals are as much as [illegible] long, including the jaws; but they vary greatly in size of body, and in length of jaws, the smaller males not exceeding half the above size. The female is somewhat smaller than the male, but is like the latter, except in having short, sharp jaws, on a correspondingly smaller head. The head, thorax, and legs are black; the [illegible] (elytra) are deep chestnut-brown, with black [illegible]. The beetles feed on the juices of twigs and leaves, which they bruise with their strong jaws. They appear fond of sugary solutions. The female lays her eggs in dead or dying, trunks and branches of Oaks or Willows; and in them the larvæ live, feeding for three or four years. Though preferring rotten material, they may also eat into the living wood, and thus do considerable damage. The [illegible] of strips of wood in the tree; and from them the beetles emerge [illegible]. Stag Beetles are frequently plentiful, *e.g.*, in Kent, but are local, and do not occur in the North of England or in Scotland. A nearly related, but smaller insect—the Small Stag [illegible] *Dorcus parallelopipedus* (see Fig. 474)—often [illegible] with *Lucanus cervus*, and is of the same habits. [illegible]

Lucanus cervus, or **Stag Beetle**—*continued.*

FIG. 473. MALE STAG BEETLE (LUCANUS CERVUS).

common in the South of England. Neither insect does much injury to quite healthy trees, because of the preference of the larvæ for decaying wood.

FIG. 474. SMALL STAG BEETLE (DORCUS PARALLELOPIPEDUS).

LUCINÆA. A synonym of **Anchieten** (which *see*).

LUCULIA (from *Luculi Swa*, its native name). ORD. *Rubiaceæ.* A genus comprising two species of very ornamental and fragrant-flowered greenhouse evergreen shrubs, the one from the Himalayas, the other from the Mountains of Khasia. The best-known and most generally cultivated species is *L. gratissima.* This is a very handsome plant, amenable to pot culture, but it thrives best in the beds or borders of a conservatory where plenty of room can be afforded. It succeeds in a compost of fibrous loam, peat, and silver sand. The roots should be inclosed in an area of about 3ft. square, with thick slates or a narrow wall, and they must not be disturbed after planting time. Large quantities of water may be applied throughout the summer, but none should be given between the pruning time in December, and April, the season for starting. Old-established plants may be cut hard back when the flowers have faded, as the new growths bear flowers the next autumn on their points. Propagation may be effected by imported seeds, which germinate freely if sown in sandy soil, and placed in a little heat, during spring or summer. The method of increase usually recommended is that of inserting cuttings of young shoots, about Midsummer, under a bell glass, subjecting them for the first two or three weeks to a gentle bottom heat. Although it is possible to propagate Luculias from cuttings, it is by no means a generally successful

Luculia—*continued.*

method, unless the conditions under which the cuttings are placed regarding shade and temperature, are just suitable to their requirements. Seedling plants grow fast, if properly attended to, but seldom bear flowers before the second or third year.

FIG. 475. FLOWERING BRANCH OF LUCULIA GRATISSIMA.

L. gratissima (very grateful).* *fl.* rose-coloured, somewhat fleshy, sweet-scented; corolla tubular; cymes terminal, many-flowered. Autumn. *l.* elliptic, acuminated, glabrous above, villous on the veins beneath. Branches terete, pubescent. *h.* 9ft. to 16ft. Temperate Himalayas, 1823. See Fig. 475. (B. M. 3946; S. B. F. G. 145.)

FIG. 476. FLOWERING BRANCH OF LUCULIA PINCEANA.

L. Pinceana (Pince's).* *fl.* white, larger and more fragrant than the above species. May to September. Khasia Mountains, 1843 This plant resembles *L. gratissima* in general habit, but has smaller, narrower, more coriaceous leaves, with more numerous nerves, and quite glabrous. The best character, however, to distinguish between the two species is the presence in *L. Pinceana* of a raised callus on each side of the sinus of the corolla lobes. See Fig. 476. (B. M. 4132.)

LUCUMA (the Peruvian name of one of the species). SYNS. *Guapeba*, *Sersalisia*, *Vitellaria*. ORD. *Sapotaceæ*. A genus comprising about sixty species of lactescent stove trees and shrubs, mostly natives of South America, extending from Chili and Peru to Mexico and the West Indies, a few Australian or New Caledonian. Flowers produced in clusters upon the sides of the branches. Fruit large, fleshy, edible, somewhat egg-shaped, 3in. to 5in. long, covered with a rusty skin. Leaves scattered, leathery, entire. Probably *L. mammosa* is the only species in cultivation. For culture, *see* **Chrysophyllum.**

L. mammosa (nippled). Marmalade Plum. *fl.* small, whitish, solitary. *fr.* large, oval or top-shaped, covered with a brownish rough skin, under which is a soft pulp, of a russet-colour, and very luscious. *l.* obovate-lanceolate and oblong, 1ft. to 2ft. long, cuspidate, glabrous. *h.* 50ft. to 100ft. South America, 1739.

LUDDEMANNIA LEHMANNI. *See* **Cycnoches Lehmanni.**

LUDIA (from *ludus*, a game, sport; in allusion to the sportive and variable shapes of the leaves). ORD. *Bixineæ*. A monotypic genus, the species being an evergreen stove shrub, native of the Mauritius, &c. It thrives in a compost of loam, peat, and sand. Propagated by cuttings, made of half-ripened shoots, and inserted in sand, under a bell glass, in bottom heat.

L. sessiliflora (sessile-flowered). *fl.*, axillary, sessile, or shortly pedicellate, calyx whitish; anthers yellow; sepals deflexed. July and August. *l.* variable, oblong or lanceolate, rigidly coriaceous, shining, acutish. *h.* 8ft. to 12ft. 1820. *L. heterophylla* is a form with abnormal leaves, some entire and obovate, others spinose-dentate.

LUDISIA. A synonym of **Hæmaria** (which *see*).

LUDOVIA. A synonym of **Carludovica** (which *see*).

LUFFA (*Louff* is the Arabic name of *L. ægyptiaca*). ORD. *Cucurbitaceæ*. A genus comprising about half-a-score species of glabrous, scabrous, or pubescent, stove, annual herbs, natives of the warm regions of the globe, one being indigenous to America. Flowers white, rather large, monœcious; racemes of the male flowers long-peduncled; female flowers solitary. Fruit oblong or cylindrical, smooth or prickly, fibrous within and containing many seeds. Leaves five to seven-lobed; petioles eglandulose at apex; tendrils twice or many-fid. Some of the gourds of this genus possess a very disagreeable odour. For culture, &c., *see* **Gourds.**

L. acutangula (acute-angled). *fl.* bright yellow. September. *l.* cordate, five to seven-angled, the angles acute, toothed. Stem sulcate. Tropical Africa, &c. (B. M. 1638, under name of *L. fœtida*.)

L. fœtida (stinking). A synonym of *L. acutangula*.

LUHEA (named after C. Van de Luhe, a German botanist, who wrote on the plants of the Cape of Good Hope at the end of the eighteenth century). SYN. *Alegria*. ORD. *Tiliaceæ*. A small genus (about sixteen species) of handsome stove trees, allied to *Sparmannia*, confined to the tropical parts of the New World. Flowers white or pink, showy, in axillary cymes or in terminal panicles. Leaves often dentate, stellate-tomentose underneath, on short footstalks. The species thrive in a compost of fibry peat and sandy loam. Propagated by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in bottom heat. Probably the species here described is the only one yet introduced.

L. paniculata (panicled). *fl.* rosy-white; cymes at the tips of the branches disposed in a large leafy panicle. March and April. *l.* broad-ovate, bluntish or acutish, cordate at the base, unequally serrate. *h.* 10ft. to 20ft. Brazil, 1828.

LUISIA (said to be called after a Spanish botanist, Don Luis de Torres). SYNS. *Birchea* and *Mesoclastes*. ORD. *Orchideæ*. A genus comprising about ten species of stove epiphytal orchids, natives of the East Indies and Eastern Asia, extending from the Malayan Archipelago to Japan. The species have lateral spikes of dingy green, purplish, or yellowish, sub-sessile flowers. Leaves terete, rigid, rush-like. Stems erect. Two or three species

Luisia—*continued.*

are in cultivation; they thrive on a block of wood, with sphagnum, and require a moist atmosphere in the summer, when in a growing state. Propagated by divisions.

L. macrotis (long-eared). *fl.* yellowish-green, with a wholly violaceous lip. Assam, 1869.

L. microptera (small-winged). *fl.* straw-colour, small, racemose; lip half purplish, half yellow. Assam, 1870.

L. platyglossa (broad-lipped).* *fl.* dull dirty-purple, or with white sepals and petals; racemes few-flowered; petals equalling, or longer than, dorsal sepals; lateral sepals keeled; lip convex, oblong, rotundate at base. Khasia. A stout species, sometimes with an enormous development of downy roots. (B. M. 3648, under name of *Cymbidium triste*.)

L. Psyche (Psyche). *fl.* curiously marked, axillary, solitary; petals yellowish-green; lip reticulated with violet-purple. *l.* quill-like, about 6in. long. Stems erect, terete. Burmah, 1865. (B. M. 5558.)

LUNARIA (from *luna*, the moon; referring to the shape of the seed-vessels). Honesty. ORD. *Cruciferæ*. A genus comprising two species of very ornamental, hardy, annual, biennial, or perennial herbs, natives of Europe and Western Asia. Flowers lilac, large, ebracteate; racemes terminal. Siliquas stipitate, broadly elliptic or oblong, compressed. Leaves petiolate, entire, cordate. Both species are well worth a place in any garden, and thrive best in a somewhat sandy soil. Increased by seeds, or by divisions.

FIG. 477. FLOWERING STEM OF LUNARIA ANNUA.

L. annua (annual).* *fl.* violet-lilac, scentless. May to July. Pods elliptical, blunt at both ends. *l.* cordate. *h.* 1½ft. to 3ft. Sweden, &c., 1595. A well-known and handsome annual or biennial plant, of which there are two or three varieties. SYN. *L. biennis*. See Fig. 477.

L. biennis (biennial). A synonym of *L. annua*.

L. rediviva (revived). *fl.* purplish, fragrant. May and June. Pods lanceolate, narrowed at both ends. *h.* 2ft. to 3ft. 1596. A perennial, not so pretty as *L. annua*, with smaller, scented flowers.

LUNATE, LUNULATE. Shaped like a half moon.

LUNGWORT. *See* **Pulmonaria.**

LUPINE. *See* **Lupinus.**

LUPINUS (the old Latin name used by Virgil and Pliny; said to be derived from *lupus*, a wolf; on account of the plant being supposed to destroy the fertility of the soil). Lupine. ORD. *Leguminosæ*. Of this genus over eighty species have been described, but some of them are very variable in our gardens. They are mostly hardy or half-hardy annual or perennial herbs and sub-shrubs, rarely shrubs, numerously dispersed in America, especially in the West, but rarer within the tropics, except in mountainous regions. In the Old World, the genus is represented only by a few annuals in the countries near the Mediterranean. Flowers blue, purplish, or variegated, rarely yellow or white, in sparse terminal racemes or in approximate whorls, often very handsome; calyx deeply two-lobed. Pods very frequently silky-villose, two-valved. Leaves simple, or digitately five to fifteen or many-foliolate, rarely trifoliolate; stipules adnate to the base of the petiole. All the Lupines are of very easy cultivation in moderately good garden soil. The seeds of the annuals, which are among the most ornamental of summer-flowering plants, may be sown, in the open border, during April or May. The perennials may be increased by seeds, in the same manner as the annuals; or by dividing the stronger-growing plants, during March or April. Comparatively few true species are seen in cultivation, as they are almost superseded by the numerous and beautiful hybrids. There is scarcely a single species of this large genus which can be considered as worthless in a flower-garden. Those described below are hardy, unless otherwise specified.

L. affinis (allied). *fl.* deep blue. June. *h.* 9in. California, 1848. Perennial.

L. albifrons (white-herbaged). A synonym of *L. Chamissonis*.

L. arboreus (tree).* Tree Lupine. *fl.* yellow, fragrant, somewhat verticillate, pedicellate. Summer. *l.*, leaflets lanceolate-linear, acute, pubescent beneath. North America, 1793. Plant shrubby. (B. M. 682; B. R. 24, 32.)

L. arbustus (shrub-like). A synonym of *L. laxiflorus*.

L. aridus (arid). *fl.* purplish-blue; upper lip of calyx bifid, lower one entire. August and September. *l.*, leaflets linear-lanceolate, villous. *h.* 1ft. North America, 1827. Perennial. (B. R. 1242.)

FIG. 478. LUPINUS (MUTABILIS) CRUIKSHANKII, showing Habit and detached Portion of Inflorescence.

L. bimaculatus (two-spotted). A synonym of *L. subcarnosus*.

L. Chamissonis (Chamisso's). *fl.* blue, verticillate, in long, slender racemes. September. *l.*, leaflets obovate-oblong, narrowed at the base. Stem and leaves clothed with silvery-silky down. *h.* 3½ft. California, 1833. Perennial. SYN. *L. albifrons* (B. R. 1642).

L. grandifolius (large-leaved). A synonym of *L. polyphyllus*.

L. laxiflorus (loose-flowered). *fl.* with the vexillum and tips of the wings blue, but the keel and base of the wings reddish; calyx entire, saccate at the base, upper lip bifid, lower one longer, ovate, and acuminated. August and September. *l.*, leaflets linear-lanceolate. *h.* 1ft. to 1½ft. North America, 1826. Perennial. (B. R. 1140.) SYN. *L. arbustus* (B. R. 1230).

L. lepidus (charming).* *fl.* with the vexillum purplish-blue inside, with a white spot at the base, and pale outside; wings purplish-blue; keel dark purple at the apex. August and September. *l.*, leaflets lanceolate, silky on both surfaces. *h.* 6in. North America, 1826. Perennial. (B. R. 1149; L. B. C. 1980.)

L. leptophyllus (slender-leaved). *fl.* violaceous, disposed in loose pedunculate racemes, somewhat verticillate; calyx pubescent, with both lips entire, and about equal in length, the upper one broadest. *l.*, leaflets linear, acute, with a few silky hairs on both surfaces. *h.* 1ft. to 3ft. Mexico. Perennial.

L. leucophyllus (white-leaved).* *fl.* pink, alternate, pedicellate, bracteolate, disposed in long racemes. June to November. *l.*, leaflets seven to nine, oblong-lanceolate; stipules subulate, woolly. *h.* 2ft. to 3ft. North America, 1826. Plant very villous. Perennial. (B. R. 1124.) SYN. *L. plumosus* (B. R. 1217).

FIG. 479. FLOWERING BRANCH OF LUPINUS NANUS.

L. littoralis (seashore-loving). *fl.* purplish-blue; both lips of calyx entire. June to October. *l.*, leaflets five to seven, linear-spathulate, silky on both surfaces. *h.* 1ft. North America, 1826. Perennial. (B. M. 2952; B. R. 1198.) SYNS. *L. nootkatensis fruticosus* (B. M. 2136), and *L. versicolor* (B. R. 1979).

L. luteus (yellow).* *fl.* yellow, fragrant, verticillate, sessile, bracteolate. June to August. *l.*, leaflets seven to nine, oblong, lower ones obovate. *h.* 1ft. to 1½ft. South Europe, &c., 1596. Annual. SYN. *L. odoratus*. (B. M. 140.)

FIG. 480. LUPINUS NOOTKATENSIS, showing Habit, detached Flower, and small Leaf.

L. macrophyllus (large-leaved). A synonym of *L. polyphyllus*.

L. microcarpus (small-fruited). *fl.* blue; whorls about six-flowered; calyx without appendage; upper lip emarginate, lower bifid. April. *l.*, leaflets nine or ten, lanceolate, hairy on under surface, smooth on upper. *h.* 1½ft. North America. Annual. (B. M. 2413.)

L. mutabilis (changeable).* *fl.* large, somewhat verticillate; the vexillum white, mixed with blue, changing to blue, with a large yellow mark in the centre; wings white, faintly striated; keel white. June to August. *l.*, leaflets seven to nine, glaucescent and rather pubescent beneath, lanceolate, bluntish. *h.* 5ft. South America, 1819. A handsome, half-hardy, erect, branched

Lupinus—*continued.*

sub-shrub. (B. M. 2682; B. R. 1539.) *L. Cruikshankii* is considered by some authors to be but a variety of this species. See Fig. 478. (B. M. 3056.)

L. nanus (dwarf).* Common Dwarf Lupine. *fl.* lilac and blue. Summer. *l.* with five to seven narrow-lanceolate, acute, hairy leaflets. *h.* 1ft. California, 1833. Annual. See Fig. 479. (B. R. 1705; S. B. F. G. ser. ii. 257.)

L. nootkatensis (Nootka Sound).* *fl.* blue, mixed with purple, white, or yellow, and streaked with more intense veins, rather verticillate, pedicellate. May to July. *l.*, leaflets seven or eight, obovate, lanceolate, hairy. *h.* 1ft. to 1½ft. Nootka Sound, 1794. Perennial. See Fig. 480. (B. M. 1311; L. B. C. 879.)

FIG. 481. INFLORESCENCE AND UPPER LEAVES OF LUPINUS POLYPHYLLUS.

L. n. fruticosus (shrubby). A synonym of *L. littoralis.*

L. odoratus (sweet-scented). A synonym of *L. luteus.*

L. ornatus (adorned).* *fl.* with a pale vexillum, blue wings, and a ciliated paler keel, rather large; upper lip of calyx bifid, lower one entire and elongated. May to November. *l.* linear-lanceolate, clothed with silvery silky down on both surfaces. *h.* 1ft. to 2ft. North America, 1826. Perennial. (B. R. 1216; S. B. F. G. ser. ii. 212.)

L. perennis (perennial).* *fl.* blue; calyx alternate, without appendage; upper lip emarginate, lower entire. May to July. *h.* 2ft. North America, 1658. Perennial. (B. M. 202.)

L. pilosus (shaggy). *fl.* rose, middle of the vexillum red, verticillate, pedicellate, bracteolate. July and August. *l.* nine to eleven, oblong-lanceolate, villous on both surfaces as well as the stem. *h.* 2ft. to 4ft. South Europe, 1710. Annual.

Lupinus—*continued.*

L. plumosus (feathery). A synonym of *L. leucophyllus.*

L. polyphyllus (many-leaved).* *fl.* usually dark blue, rather verticillate, pedicellate. Spring and autumn. *l.*, leaflets eleven to fifteen, lanceolate, hairy beneath. *h.* 4ft. Columbia, 1826. A well-known perennial, the commonest and one of the best. See Fig. 481. SYNS. *L. grandifolius*, *L. macrophyllus.* (B. R. 1096, 1377; S. B. F. G. ser. ii. 356.)

L. Sabinianus (Sabine's). A synonym of *L. Sabinii.*

L. Sabinii (Sabine's). *fl.* yellow; wings roundish, size of standard; calyx villous, with the upper lip ovate and acute, lower one boat-shaped, revolute. May and June. *l.*, leaflets seven to twelve, lanceolate, acuminated, silky. *h.* 2ft. to 3ft. North America, 1827. Perennial. SYN. *L. Sabinianus.* (B. R. 1435.)

L. subcarnosus (nearly fleshy-leaved).* *fl.* deep rich blue, with a yellowish blotch in the lower part of the standard, lower lip of calyx entire. July. *l.* on long petioles, of five obovate-lanceolate, thick, almost fleshy, retuse leaflets, those of the lower leaves shortest and broadest. Stem downy. *h.* 1ft. Texas, 1835. Perennial. (B. M. 3467.) SYNS. *L. bimaculatus* (S. B. F. G. ser. ii. 314), *L. texensis* (B. M. 3492).

L. texensis (Texan). A synonym of *L. subcarnosus.*

L. tomentosus (tomentose). *fl.* large, variously coloured, and combinations of different colours, verticillate, pedicellate. Summer. *l.*, leaflets eight to ten, oblong, bluntish, mucronulate, tapering to the base. *h.* 4ft. to 5ft. Peru, 1825. A very handsome half-hardy shrub, clothed in every part with silky tomentum.

L. varius (variable). *fl.* usually dark blue, large, somewhat verticillate or alternate, pedicellate. July and August. *l.*, leaflets oblong-lanceolate, villous beneath, usually five or six in number. *h.* 2ft. to 3ft. Spain, &c., 1596. Annual.

L. versicolor (various-coloured). A synonym of *L. littoralis.*

LUSSACIA. A synonym of **Gaylussacia** (which *see*).

LUXEMBURGIA (named after a Duke of Luxembourg, under whose auspices M. Auguste St. Hilaire commenced his voyage to Brazil). SYN. *Plectranthera.* ORD. *Ochnaceæ.* A genus comprising seven species of showy, branched, very glabrous, stove trees or shrubs, natives of Brazil. Flowers yellow, disposed in terminal racemes. Leaves alternate, toothed, mucronate, oblong, finely veined. The species thrive in a peat and loam soil, and require an abundant and constant supply of water. Propagated by cuttings of half-ripened shoots, placed in sand, under a bell glass, in gentle bottom heat.

L. ciliosa (ciliated). *fl.* yellow; corymbs many-flowered. Summer. *l.* crowded, on long petioles, oblong-lanceolate, glandularly setose, setosely mucronate. *h.* 8ft. to 12ft. Brazil, 1848. (B. M. 4048; P. M. B. xi. 3.)

L. corymbosa (corymbose). *fl.* yellow, large, few, disposed in corymbs. Summer. *l.* on short petioles, narrow-oblong, acutish, cuneated at base. Brazil, 1840. Tree.

LUZURIAGA (named in honour of Ignatio M. R. de Luzuriaga, a Spanish botanist). SYNS. *Callixene* and *Enargea.* ORD. *Liliaceæ.* A small genus (three species) of half-hardy shrubby-branched under-shrubs, two of which inhabit Chili, and the third is a native of the region of the Magellan Straits and New Zealand. Flowers white, solitary or few, in the axils of the leaves; pedicels slender; perianth deciduous; segments distinct, sub-equal, spreading. Berry sub-globose, indehiscent. Leaves often sessile, alternate, rather small, oblong-elliptic, prominently three to many-nerved. Stems shrubby, glabrous. The species thrive on turves of fibry peat, or attached to stems of tree ferns. They like shade and moisture. Propagated by cuttings.

L. erecta (erect).* *fl.* solitary, in the axils of the leaves; perianth frequently dotted with reddish-brown. Berry ¼in. thick. *l.* alternate, oblong, ½in. to 1in. long. *h.* 1½ft. Chili. A copiously-branched, sub-scandent sub-shrub. SYN. *Callixene polyphylla* (under which name it is figured in B. M. 5192).

L. marginata (margined). *fl.* solitary, in the axils of the leaves of the upper branches, scented like Heliotrope; pedicels very short, erect. *l.* alternate, sessile, ascendent, oblong, thick, rigid, pale green, mucronate, ½in. to ¾in. long; margin revolute. Tierra del Fuego. SYN. *Callixene marginata.*

L. radicans (rooting). *fl.* pure white, large, 1½in. in diameter, regular, star-shaped; anthers yellow, connivent into a cone. Summer. *l.* sessile, glabrous, ovate-lanceolate. Stems slender, wiry. Chili and Peru.

LYCASTE (called after Lycaste, the beautiful daughter of Priam). Including *Colax* and *Paphinia*. ORD. *Orchideæ*. A genus comprising about twenty-five species of very ornamental stove or greenhouse epiphytal or terrestrial orchids, natives of tropical America, extending from Peru to Mexico and the West Indies. They are nearly allied to *Anguloa*. The genus is remarkable in having the middle of the lip furnished with a transverse, fleshy, entire or notched appendage. The species are of easy culture, and especially valuable to the amateur grower, as they require very little artificial heat. They should be potted in rough fibrous peat and sphagnum, and drained well; for, although these plants produce stout pseudo-bulbs, which would enable them to sustain life for a long time, they nevertheless increase faster, and flower more profusely, when kept moderately moist during the resting season. Whilst growing, Lycastes can scarcely have too much water, always providing it is allowed to pass away quickly, and that plenty of air be admitted. Propagated by division, after flowering. Stove species, except where otherwise stated.

L. aromatica (aromatic).* *fl.* yellow, disposed in spikes; lip very hairy. Winter and spring. Mexico, 1828. A common and very free-flowering species, remaining in beauty for four or five weeks. (B. R. 1871, under name of *Maxillaria aromatica*.)

L. Barringtoniæ (Mrs. Barrington's). *fl.* greenish, nodding; perigonal divisions ovate-oblong, pointed; lateral cohering, and forming a bluntly conical spur-like auricle; lip smaller; middle lobe ovate-oblong, blunt, ciliate; scape as long as the petioles. April. *l.* oblong, pointed, tapering to the slender petiole. Jamaica, 1790. (B. R. 1206, under name of *Maxillaria ciliata*.)

L. B. grandiflora (large-flowered). This differs from the type chiefly in the very large size of the flowers, which are as much as 5in. in diameter. West Indies, 1868. (B. M. 5706.)

L. cristata (crested).* *fl.* white outside, interruptedly banded with purple inside; petals purple, whitish at base; scape pendulous, few-flowered. June to August. *l.* oblong-lanceolate, shortly stalked, plicate. Trinidad, 1834. (B. M. 4836, under name of *Paphinia cristata*; B. R. 1811, under name of *Maxillaria cristata*.)

L. cruenta (bloody).* *fl.*, sepals greenish-yellow; petals deep orange; lip deep orange, blotched with crimson. March and April. Guatemala, 1841. This very free-flowering species thrives in a vinery, or even a greenhouse. It remains in beauty a month. (B. R. 1842, 13, under name of *Maxillaria cruenta*.)

L. Deppei (Deppe's).* *fl.* pale greenish-yellow, blotched with brown; lip white, spotted with crimson, having a golden-yellow crest. Winter and spring. South Mexico, 1828. A distinct, though not very handsome, species, flowering freely, and remaining in beauty for a considerable time. SYN. *Maxillaria Deppei* (B. M. 3395).

L. fulvescens (tawny). *fl.* tawny, orange; sepals lanceolate, lateral ones falcate; lip oblong; lateral segments small, acute; middle one ovate, obtuse, fringed, with a fleshy emarginate appendage. *h.* 2ft. Columbia. (B. M. 4193.)

L. gigantea (gigantic). *fl.*, sepals and petals green, shaded with brown, from 3in. to 4in. long; lip of a deep purple colour, margined with rich orange, serrated; column white. June and July. Central America, 1848. (B. M. 5616; B. R. xxxi. 34.)

FIG. 482. FLOWER OF LYCASTE JUGOSA.

L. jugosa (mountainous).* *fl.* about 2in. in diameter; sepals cream-colour; petals white, with numerous stripes of rich dark purple; lip white, irregularly striped and veined with deep velvety-purple; scape erect, two or three-flowered. April and May. *l.* in twos, dark green, 2in. broad. Pseudo-bulbs smooth

Lycaste—*continued.*

and somewhat ovate. Brazil, 1867. The compost best suited for this species is one formed of chopped sphagnum and good peat, to which some medium-sized lumps of charcoal may be added, with considerable advantage. SYN. *Colax jugosus*. See Fig. 482. (B. M. 5661.)

L. lanipes (woolly-stalked). *fl.* solitary; sepals and petals creamy-white; lip white, beautifully ciliated or fringed along its margin. October. *l.* lanceolate, 12in. to 18in. long. Pseudo-bulbs large. South America, 1848. Often met with in collections under the name of *L. Barringtoniæ*.

L. lasioglossa (hairy-lipped).* *fl.* 5in. long, inclined; sepals dull cinnamon-brown, spreading, narrow-oblong; petals golden-yellow, one-third the length of sepals, arched, with rounded tips; lip golden-yellow, with purple spots on the midlobe, narrow, about equalling the sepals; midlobe clothed with interlaced hairs; scape stout, with a sheath above the middle. *l.* 8in. to 12in. long, elliptic-lanceolate, acuminate, plaited, bright green. Pseudo-bulbs 3in. long, ovoid, compressed, grooved. Guatemala, 1872. (B. M. 6251.)

L. linguella (small-tongued). *fl.* whitish; lateral sepals deflexed. January. Peru (?), 1871. This plant is closely related to *L. ciliata* and *L. lanipes*. (B. M. 6303.)

L. Puydtii (Puydt's). *fl.* green, with a few dark purple-brown spots on the central part of the sepals, and numerous confluent ones on the petals; lip livid violet. Brazil, 1880. Probably only a variety of *L. jugosa*. SYN. *Colax Puydtii*. (I. H. n. s. 369).

L. Skinneri (Skinner's).* *fl.* from 4in. to 6in. across, solitary; sepals and petals white, more or less suffused with rose; lip rosy-lilac, frequently very heavily blotched with the deepest rosy-crimson; scapes from 6in. to 12in. high. November to March. *l.* solitary, long, broad, dark green, plaited. Pseudo-bulbs large, dark green. Guatemala, 1842. A splendid species, and one of the most profuse-flowering orchids in cultivation. (B. M. 4445.) It has numerous very beautiful varieties, of which the following is a good selection:

L. S. delicatissima (very delicate). *fl.* large, about 6in. across; sepals and petals pinkish-white; lip white, intermixed with rose. February. (W. S. O. 10.)

L. S. gloriosa (glorious). *fl.*, sepals very large and broad, pale pink; petals rich rosy-pink, somewhat lighter inside; lip white towards the front. Guatemala.

L. S. picturata (spotted). *fl.* large, 7in. across; sepals and petals strongly tinged with rose; lip white, spotted, and heavily stained at the base with crimson. (W. S. O. 10.)

L. S. purpurata (purple). *fl.* large, 6in. across; sepals and petals blush-white; lip rich crimson-purple. (W. S. O. 10.)

L. S. rosea (rosy). *fl.* large, quite 7in. in diameter; sepals and petals rich dark rose; lip white, spotted with crimson. Guatemala. A very fine variety.

L. S. superba (superb). *fl.*, sepals and petals blush-white; lip very rich crimson. Guatemala. Another splendid variety.

L. S. virginalis (virginal). *fl.*, sepals and petals snow-white; lip white, with a faint tinge of lemon towards the base. Guatemala. A very handsome but rare variety.

L. Smeeana (Smee's). *fl.* white, except the lip, which has a light purple border of the triangular acute undulate anterior lacinia, rows of small purple stripes, and spots over the whole surface; petals purple-spotted on the inside. Probably a hybrid between *L. Deppei* (having similar flowers) and *L. Skinneri*.

L. tetragona (tetragonal). *fl.* green, yellow, and purple, solitary; sepals oblong, obtuse, spreading; petals similar, but smaller; lip fleshy, ventricose, three-lobed, erect; lateral lobes small, acute; middle one convex outside. June. *l.* oblong-lanceolate, plicate. Pseudo bulbs tetragonal. *h.* 6in. Brazil, 1830. (B. M. 3146, under name of *Maxillaria tetragona*; B. R. 1428.)

LYCHNIS (the old Greek name given by Theophrastus to this or a similar plant, from *lychnos*, a lamp, perhaps referring to the brilliancy of the flowers). Rose

FIG. 483. SEED VESSEL OF LYCHNIS.

Campion. Including *Agrostemma*, *Githago*, *Melandrium*, *Petrocoptis*, and *Viscaria*. ORD. *Caryophylleæ*. A genus comprising about thirty species of ornamental hardy annual or perennial plants, widely spread over the

Lychnis—*continued.*

Northern hemisphere without the tropics. The general characters of this genus are those of *Silene*, from which it differs in having five styles; calyx inflated, five-toothed, ten-nerved; capsule (see Fig. 483) septicidal, opening by as many teeth as there are styles; seeds with small tubercles; the petals also usually have an appendage at

FIG. 484. LYCHNIS ALPINA, showing Habit and detached Portion of Inflorescence.

the base of the blade. All the species are of very easy culture, thriving in almost any ordinary garden soil, but succeeding best in a light, rich loam. Propagation is readily effected in spring, by divisions, or by seeds. All the species described below are perennials.

FIG. 485. FLOWERING BRANCH OF LYCHNIS CHALCEDONICA.

L. alpina (Alpine).* *fl.* pink, disposed in close, compact heads, ½in. in diameter; petals narrow, deeply two-cleft; calyx short. Spring and summer. *l.* crowded, linear-lanceolate, slightly

Lychnis—*continued.*

fringed; lower ones tufted. *h.* 6in. Alps of Europe (Britain). See Fig. 484. (B. M. 394.)

L. chalcedonica (Chalcedonican).* *fl.* scarlet, in dense corymbose clusters; calyx round, clubbed, ribbed. Summer. *l.* lanceolate, slightly cordate at base, pilose, stem-clasping. *h.* 1½ft. to 3½ft. Russia, &c., 1593. A well-known and deservedly favourite plant, of which there are several varieties, including double white and double red. It thrives best in a sandy loam, enriched with well-rotted manure. The single forms, white and red, may be propagated by seed, which ripens very freely, and is practically self-sowing. The double kinds should be divided early in spring. See Fig. 485. (B. M. 257.)

FIG. 486. FLOWERING BRANCH OF LYCHNIS CORONARIA.

L. coronaria (crowned).* *fl.* red; petals emarginate; calyx subcampanulate, costate; peduncles elongated, one-flowered. July. *l.* broadly lanceolate, coriaceous. *h.* 3ft. South Europe, 1596. See Fig. 486. (B. M. 24.)

FIG. 487. COROLLA OF LYCHNIS FULGENS.

L. diurna (day-flowering).* Bachelors' Buttons; Common Red Lychnis; Red Campion. *fl.* purplish-rose; panicle terminal, many-flowered; calyx very hairy. Spring to autumn. *l.* opposite, lower ones obovate-spathulate, upper ones oval-elliptical *h.* 1ft. to 3ft. Northern hemisphere (Britain). (Sy. En. B. 211, under name of *Silene diurna*.) A showy and pretty plant under

Lychnis—*continued.*

cultivation; the double form, however, is the more attractive one, and is one of the best plants of this genus for borders. It is increased only by divisions.

L. Flos-cuculi. Cuckoo Flower; Ragged Robin. *fl.* red; panicle loose, terminal, forked, clammy; calyx purplish-red, the ten ribs darker; petals divided into four linear segments, the middle one the longest. Summer. *l.* few, linear-lanceolate. *h.* 1ft. to 2ft. Europe (Britain), Siberia. A well-known and common plant, occurring in nearly all marshy places. (Sy. En. B. 212.) The double-flowered form is a most desirable plant for borders.

L. flos-Jovis (Flower of Jove). A synonym of *Agrostemma flos-Jovis.*

L. fulgens (brilliant).* *fl.* brilliant vermilion, large, handsome, disposed in fastigiate corymbs; petals four-cleft, outer segments awl-shaped; calyx terete, woolly. Spring and summer. *l.* ovate-lanceolate, hairy. *h.* 6in. to 12in. Siberia, 1822. See Fig. 487. (B. M. 2104.)

FIG. 488. COROLLA OF LYCHNIS FULGENS GRANDIFLORA.

L. f. grandiflora (large-flowered). *fl.* scarlet, about 2in. across, solitary, or in threes, terminal and axillary; petals prettily lacerated. Summer and autumn. *l.* ovate, almost sessile, smooth. *h.* 3in. to 12in. China, 1774. This variety requires a warm border. See Fig. 488.

FIG. 489. COROLLA OF LYCHNIS FULGENS HAAGEANA.

L. f. Haageana (Haage's).* *fl.* brilliant scarlet, about 2in. across, in twos or threes; petals broadly obovate, indented on the top, and furnished with two long teeth at the side, calyx shaggy, inflated, angular. Summer. *l.* large, lanceolate, acuminate, hairy, purplish underneath. Stems very shaggy. A garden hybrid, probably from *L. fulgens.* It is a showy and exceedingly handsome border plant. See Fig. 489. (R. G. 391.) There are numerous varieties of it, affording nearly every shade of colour, from scarlet to pure white.

L. f. Sieboldi (Siebold's). *fl.* pure white, very large; cyme contracted, terminal, few-flowered; petals wedge-shaped, irregular, margins jagged, slightly two-lobed. Summer. *l.* sessile, lower ones oblong, middle and upper ones ovate-oblong, acute, entire, soft and downy. *h.* 1ft. Japan. See Fig. 490.

L. Lagasca (Lagasca's).* *fl.* bright rose, with white centres, less than 1in. in diameter. Spring and summer. *l.* obovate or oblong, somewhat coriaceous, slightly glaucous. *h.* 3in. Pyrenees, 1867.

Lychnis—*continued.*

An elegant little compact-growing and tufted plant for rockwork; it thrives best on sunny slopes. SYN. *Petrocoptis pyrenaica.* (B. M. 5746.)

FIG. 490. COROLLA OF LYCHNIS FULGENS SIEBOLDI.

L. oculata (eyed). *fl.* pinkish-purple, the emarginate petals having an intense purple spot at the base; appendage shortly ovate; calyx suddenly contracted below the middle, the angles clavate, rugoso-crispate. July. Algiers, 1843. SYN. *Viscaria oculata* (under which name it is figured in B. M. 4075 and B. R. 1843, 53).

L. Preslii (Presl's). *fl.* purplish, nearly 1in. in diameter, numerously produced in forked, panicled clusters, and having reddish bracts; corona fringed, satiny-rose; calyx reddish, much inflated. Summer. *l.*, root ones numerous, oval-lanceolate or obovate acuminated, decurrent, in rosettes; those of the stem oval obtuse, entire, much-veined, dark green. *h.* 1ft. to 1½ft. Bolivia.

L. pyrenaica (Pyrenean).* *fl.* pale flesh-colour, about ½in. across, disposed in forked clusters; pedicels long, one-flowered; petals slightly notched; calyx bell-shaped. Summer. *l.* opposite, glaucous, root ones spathulate, those of the stem cordate, sessile. *h.* 3in. to 4in. Pyrenees, 1819. (B. M. 3269.)

L. vespertina (evening-flowering).* *fl.* white, emitting a pleasant odour in the evening, and disposed in loose terminal panicles; calyx over ¾in. long, hairy, ribbed; petals cleft. Summer. *l.* opposite, connate, oval-oblong, acuminated, tapering at the base, hairy. Stems purplish, swelling at the joints. *h.* 1ft. to 3ft. Europe (Britain), Asia, &c. The double-flowered form is that most usually cultivated.

L. Viscaria (clammy).* German Catch-fly. *fl.* rosy, in close heads; petals bifid; calyx tubular, narrow, about ½in. long. Summer. *l.* opposite, narrow-lanceolate, with a slightly woolly fringe at the base. Stems smooth, clammy in the upper part. *h.* 1ft. Europe (Britain), Siberia. There are several very desirable varieties of this pretty plant; the double-flowered form, and the one with deep red flowers, known as *splendens*, are especially so.

LYCIOPLESIUM. A synonym of **Latua** (which *see*).

LYCIUM (from *Lukion*, a name given to the Rhamnus by Dioscorides, as coming from Lycia, in Asia Minor). Box Thorn. ORD. *Solanaceæ.* An extensive genus (about seventy species have been described) of hardy or nearly hardy, deciduous, climbing or trailing, often spiny, shrubs or small trees. Flowers whitish, pale violet, pink, scarlet, or yellowish, small, variously disposed; corolla funnel-shaped. Leaves simple, entire or nearly so. The species are very free-flowering, and are admirably adapted for training against trellis-work or walls. They thrive in almost any well-drained and porous soil. Propagation is easily effected, in autumn or spring, by cuttings, by layers, or by suckers. In all probability, the only species introduced are those described below, which are all hardy.

L. afrum (African).* *fl.* violet, almost axillary, solitary, drooping. June and July. *l.* fascicled, linear, canescent, attenuated at the base, obtuse, fleshy. *h.* 6ft. to 10ft. North Africa, 1712. An ornamental, erect, spiny shrub. (B. R. 354; S. B. F. G. 324.)

L. barbarum (Barbary).* *fl.*, twin, extra-axillary, pedicellate; corolla with a purple limb and a yellowish base. May to August. *l.* lanceolate, flat, glabrous, acute. Branches angular, dependent. North Asia, 1696. An ornamental climbing shrub.

L. chinense (Chinese). *fl.* purple; peduncles much longer than the entire calyx. May. *l.* in threes, ovate, acute, attenuated at the base. Branches pendulous, prostrate, striated. China. A climbing shrub, very closely allied to *L. europæum*, but the tube of the corolla is shorter, and constricted in the middle.

Lycium—*continued.*

L. europæum (European). *fl.* pale violet, reticulated with red veins, twin or solitary. May to August. *l.* fascicled, obovate-lanceolate, obtuse or spathulate, bent obliquely. Branches erect, loose. *h.* 10ft. to 12ft. South Europe, 1730. An erect, spiny shrub.

L. fuchsioides (Fuchsia-like). A synonym of *Iochroma fuchsioides.*

LYCOPERDON (from *lykos*, a wolf, and *perdein*, to break wind; some of the older writers believed that this fungus developed from the dung of the wolf). A genus of fungi, known also as "Puff-balls." This latter name is given to them because of the abundant brown dusty spores, like snuff, that are emitted when the plant is mature and bursts, either naturally or by pressure from without. *Lycoperdon* belongs to the group of *Trichogastres*, together with the "Starry Puff-balls" (*see* **Geaster**), which have the outer rinds splitting like a star, and recurved. There are several kinds common in Britain on meadows and lawns, in woods, &c. Among the most widely known is

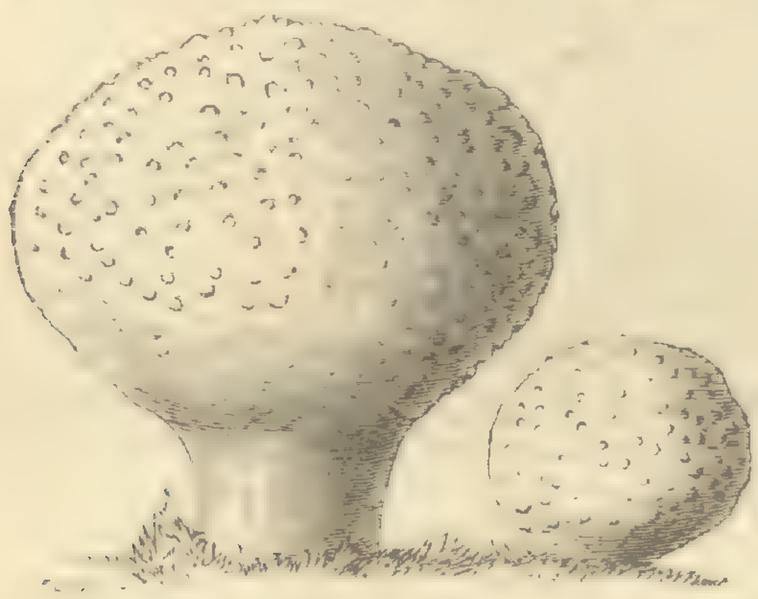

FIG. 491. LYCOPERDON GEMMATUM.

L. gemmatum (see Fig. 491), which, in size and general appearance, may be regarded as a fair type of the genus. On their first appearance they are like white balls, and of a fleshy texture; some kinds form an indistinct stalk, while others have no stalk. When cut across in this state, they are found to have a compact rind, filled with loose tissue of indistinct threads, which leave between them small spaces; on the sides of these spaces are situated larger cells, each bearing at their free end four spores, supported on short slender stalks. The fungus changes from yellowish-brown to dark brown as the spores ripen. At last, the rind tears open at the apex, and the spores are ejected, leaving a fibrous mass of filaments behind them. The Puff-balls, while white and fleshy, are edible; and *L. giganteum*, a species that grows so large as to suffice for a meal for ten or twelve persons, is esteemed as an article of food by many people. The balls cease to be good for food when they begin to turn brown. The fibrous mass that remains after the spores have escaped is sometimes used as a styptic for wounds, or in making tinder.

LYCOPERSICUM (from *lykos*, a wolf, and *persicon*, a peach; in allusion to the fleshy fruit, and its inferiority compared with the peach). Love Apple; Tomato. ORD. *Solanaceæ.* A genus of three or four species of herbaceous, unarmed, procumbent plants, inhabiting South America, distinguished chiefly from the allied genus *Solanum* by the stamens having their anthers connected together by a thin membrane, which is prolonged upwards. Peduncles solitary, extra-axillary, many-flowered; corollas rotate, with a very short tube. Fruit fleshy, usually red or yellow, divided into two, three, or many cells, containing numerous seeds imbedded in the pulp. Leaves impari-pinnate. For culture, varieties, &c., of *L. esculentum*, *see* **Tomato.**

L. esculentum (edible). *fl.* green, numerous, several joined in one. Summer. *l.* unequally pinnate; leaflets cut, attenuated at the apex, glaucescent beneath. *h.* 2ft. to 3ft. South America, 1596. Plant pilose.

LYCOPODIACEÆ. A natural order of cryptogams, comprising four genera and about 150 species. They are found in all climates, and are either terrestrial or epiphytal perennials. Generally speaking, the rootstock is running or creeping, but sometimes there is a corm. The stems are dichotomously branched, are leafy throughout, and usually rigid. The leaves are imbricate all round the stems, and are arranged in from two to six ranks; they are simple, nerveless, or one-nerved. The capsules or sporangia are sessile in the axils of the leaves or of the scales of a terminal, axillary, sessile or stalked cone, are one to three-celled, compressed, often kidney-shaped, and two-valved. The general affinities of the order are with *Filices.*

LYCOPODIUM (from *lykos*, a wolf, and *pous*, a foot; the roots have a resemblance to a wolf's paw). Club Moss. ORD. *Lycopodiaceæ.* A genus of about 100 species of stove, greenhouse, or hardy perennial plants, allied to *Selaginella*, but distinguished from that genus by the coniferous habit, and the single form of capsules. The leaves vary from mere threads to imbricated scales. Lycopodiums may be distinguished by the following characters: Capsules axillary, solitary, sessile, roundish, one-celled, some two-valved, including a powdery substance; others three-valved, containing a few large grains or spores. This genus contains numerous very handsome plants for Wardian or other fern cases. As a rule, they thrive in a rough, spongy peat. The native species are also very pretty plants for conservatory or Wardian case culture; they should be shaded from the sun. *See also* **Selaginella.**

L. alpinum (alpine). Stems prostrate. Branches in tufts, erect, forked, level-topped. *l.* acute, keeled, imbricated in four rows; spikes terminal, solitary, sessile, cylindrical, their leaves broadly-lanceolate, flat. Europe, &c. (Britain). A very pretty evergreen species, about 4in. high, and of a bright green colour.

L. annotinum (year-old). Stems decumbent at the base. Branches ascending, forked. *l.* in five rows, narrow-lanceolate, acute, minutely serrate; spikes cylindrical, solitary, sessile. Northern hemisphere (Britain). A distinct and pretty species, 6in. to 8in. high, easily distinguished by its branches being constricted here and there.

L. cernuum (drooping). Stems from 8in. to 2½ft. high. Branches much-forked. *l.* distant, somewhat acicular, bright light green. Tropics. A very handsome stove species, somewhat difficult to cultivate successfully; it varies considerably under different conditions, but usually only in the height and in the density of its branches. This species should have a compost of loam, peat, and limestone—fully two parts of the latter—and be well drained.

L. clavatum (club-shaped). Common Club Moss. Stems creeping, branched, 1ft. to 3ft. long. Branches ascending. *l.* crowded, narrow-lanceolate, incurved, hair-pointed; spikes in pairs, cylindrical, stalked, with ovate, membranaceous leaves. Arctic and North and South temperate and cold regions (British Isles), &c. A handsome plant.

L. dendroideum (tree-like).* Stems erect, much-branched, growing to a height of from 6in. to 9in. *l.* small, bright shining green; spikes yellow, long, cylindrical, erect. North America (in moist woods). A very pretty hardy plant, resembling, when growing vigorously, a miniature Spruce Fir. It makes an excellent plant for rockwork, if grown in a deep bed of moist sandy peat, with full exposure to the sun. It may be propagated by sowing the spores in a rather shady spot and on a perfectly level surface.

L. densum (dense). Stems erect, slender, much-branched. *l.* numerous, dense, short, sharp-pointed, bright green. Australia. A very handsome greenhouse plant.

L. Hookerii (Hooker's). Stem erect, several times divided towards the base; on each division hangs a bunch of slender catkins, from three to five in number, also branched, and some 4in. long, bearing the sporangia, giving the plant a very pleasing and novel appearance. *l.* bright shining green, nearly 1in. long. *h.* 2ft. or more. East Indies. A very handsome stove, evergreen, epiphytal species, requiring to be grown in peat, and suspended so that the plant hangs downwards.

L. Phlegmaria (Phlegmaria).* This species is closely allied to *L. Hookerii*, but not nearly so robust; the contracted fertile catkins, being more elegant and more slender than those of *L. Hookerii*, give the plant a beautiful tasselled appearance. Tropics. A stove evergreen epiphyte.

L. scariosum (scarious). Stems from 9in. to 2ft. high, rigid, branched, erect; branches flattened, the leaves situated on each side and decurrent with it, light green; spikes or fertile catkins 2in. to 3in. long, light brown, imbricated, numerously disposed on

Lycopodium—*continued.*

slender, upright stems, 3in. to 4in. high. New Zealand. A rare and handsome, terrestrial, greenhouse species.

L. Selago (Selago). Fir Club Moss. Stems erect, 3in. to 4in. high, forked. Branches level at the top. *l.* in eight rows, uniform, narrow-lanceolate, acute, entire. Temperate and cold regions of both hemispheres (British Isles).

L. taxifolium (Yew-leaved).* Stems thickly clothed with bright green, acuminate leaves, about ½in. long. *h.* 9in. to 12in. Jamaica. A very handsome stove species; the ends of its branches are swollen, and the sporangia situated at the base of the leaves. It must be suspended head downwards. (B. H. 1871.)

L. uliginosum (swamp-loving). Stems slender, much-branched. *l.* small, very closely set, bright dark green. *h.* 6in. Australia. A pretty greenhouse species, thriving well in peat and sand, and with plenty of drainage.

L. verticillatum (whorled). Stems several times forked. *l.* in whorls round the stem, ¼in. long, acuminate, dark green. Mauritius. A very handsome, procumbent, stove species, growing from 10in. to 20in. long.

LYCORIS (named after a beautiful Roman actress, mistress of Marc Antony). ORD. *Amaryllideæ*. A genus comprising three species of greenhouse bulbous plants, natives of China, Japan, and Central Asia, allied to *Amaryllis*, from which they may be distinguished by the undulated divisions of the spreading perianth being curved upwards, and bearing a simple fringed stigma. For culture, &c., *see* **Amaryllis.**

L. aurea (golden).* *fl.* golden-yellow, stalked, erect, funnel-shaped, clavate; segments linear-lanceolate. August and September. *l.* greenish, strap-shaped. *h.* 1ft. China, 1777. A very pretty species, the flowers appearing before the leaves. SYN. *Amaryllis aurea* (under which name it is figured in B. M. 409).

L. radiata (rayed). *fl.* deep pink, approaching to scarlet. June. *l.* linear-ligulate, obtuse, glaucous-green, about ½in. wide. *h.* 1½ft. China, 1758. SYN. *Nerine japonica*. (B. R. 596; A. B. R. 95, under name of *Amaryllis radiata*.)

FIG. 492. LYCORIS SEWERZOWI, showing Habit, and detached Flower (natural size).

L. Sewerzowi (Sewerzow's).* *fl.* brownish-red, fragrant. Summer. *l.* strap-shaped, bluntish. *h.* 1ft. Turkestan, 1877. See Fig. 492. (R. G. 914.)

LYDA. A genus of Sawflies, the larvæ of which do considerable damage to trees. The larvæ have no prolegs, but at the end of the body are two organs somewhat like true legs, and with the help of these organs they move along slowly. They are usually semi-social, spinning a web in common over twigs and leaves, but also each spinning a separate tube for itself within the web, in which it lives. They become pupæ in the soil. *L. nemoralis* and *L. Pyri* injure Plums and other stone-fruit trees, Apple and Pear-trees, &c., and they also eat Hawthorn; other species feed on Willows, Birches, and Alder, and several (*L. campestris*, *L. erythrocephala*, &c.) do very considerable injury to conifers. The habits of the larvæ facilitate their destruction in the webs, the appearance of which is shown at Fig. 493.

Lyda—*continued.*

FIG. 493. LARVÆ AND WEB OF LYDA PYRI.

LYGEUM (from *lygeo*, to bend; alluding to the flexibility of the plant). ORD. *Gramineæ*. The only species of this genus is a hardy perennial grass. It thrives in any light loamy soil, and may be increased by dividing at the roots.

L. Spartum (Spartum). *fl.* hermaphrodite; peduncle terminal; spikelet usually large, erect or nodding, two, rarely three-flowered. May. *l.* rush-like, erect, long, convolute-terete, subulate, acuminate. *h.* 1½ft. Mediterranean region (rocky places on the seashore), 1776. This species furnishes Albardine, a valuable material for paper-making. The plant which yields the Esparto of the paper-makers is *Macrochloa tenacissima*.

LYGODICTYON FORSTERI. A synonym of **Lygodium reticulatum** (which *see*).

LYGODICTYON HETERODOXUM. A synonym of **Lygodium heterodoxum** (which *see*).

LYGODICTYON LINDENI. A synonym of **Lygodium heterodoxum** (which *see*).

LYGODIUM (from *lygodes*, flexible; referring to the flexible habit). ORD. *Filices*. A genus comprising about eighteen species of handsome, wide-scandent, twining, mostly stove ferns, widely diffused. Capsules solitary (or casually in pairs), in the axils of large, imbricated, clasping involucres, which form spikes either in separate pinnæ or in lax rows along the edge of the leafy ones. The species are readily distinguishable from all others by their wide-scandent climbing stems; the fronds are permanent, and become interlaced with each other, sometimes forming, together with other plants, impervious thickets. As a rule, the species thrive in a compost of peat, loam, and sand, in equal parts. For general culture, *see* **Ferns.**

L. articulatum (jointed). *primary petiole* ¼in. to ½in. long; *secondary* 1in. or more long; barren pinnules twice forked, each bearing four ligulate-oblong segments, which are 2in. to 3in. long, about ½in. broad, blunt at the point, very distinctly articulated at the base on a short petiole; fertile pinnules many times dichotomous, the short spike in dense clusters, which are often almost destitute of lamina. New Zealand, 1844.

L. circinatum (circinate). A synonym of *L. dichotomum*.

L. dichotomum (dichotomous).* *primary petiole* so much reduced that the fork seems almost to spring from the main rachis; *secondary* 1in. to 2in. long, firm, naked; pinnules digitate, with five or six lobes reaching nearly down to the base, or once or even twice forked; ultimate barren divisions 4in. to 8in., or even 12in. long, ½in. to ¾in. broad, the fertile ones contracted. *spikes* one to two lines long, in close marginal rows. Chusan, Hong Kong, &c. SYNS. *L. circinatum* and *L. pedatum*.

L. Forsteri (Forster's). A synonym of *L. reticulatum*.

L. hastatum (halbert-shaped). A synonym of *L. volubile*.

Lygodium—*continued.*

L. heterodoxum (heterodox). *primary petiole* obsolete or very short; *secondary* 1½in. long; pinnules with two or three bipartite segments, the ultimate divisions 4in. to 6in. long, ¾in. broad, the petioles not articulated, the lowest often ½in. long. *spikes* one line long, in close rows along the edge of the leafy divisions. Mexico. SYNS. *L. Lindeni* (of gardens), *Hydroglossum heterodoxum*, *Lygodictyon heterodoxum*, and *Lygodictyon Lindeni*.

FIG. 494. LYGODIUM JAPONICUM, showing Habit and detached Portion of Frond.

L. japonicum (Japanese).* *primary petiole* very short; *secondary* ½in. to 1in. long; pinnules 4in. to 8in. long, nearly as broad, deltoid; the terminal segments pinnatifid or hastate; the lateral ones long-stalked, and pinnate in the lower part; the divisions entire or crenulate. *spikes* one to two lines long, the lamina of the fertile divisions often much reduced. Japan to Australia. Greenhouse. SYN. *Ophioglossum japonicum*. See Fig. 494.

L. Lindeni (Linden's). A garden synonym of *L. heterodoxum*.

L. microphyllum (small-fronded). A form of *L. scandens*.

L. palmatum (palmate).* *primary petiole* slender, ⅛in. to ¼in. long, each fork in the lower part of the stem bearing a single cordate, palmate pinnule 1½in. to 2in. broad, not so deep, bluntly four to six-lobed more than half-way down, the slender petiole ½in. to ¾in. long; fertile pinnules sub-deltoid, three or four-pinnatifid, formed only of winged rachises and short spike-like fertile ultimate divisions, the latter linear, 1in. to 1½in. long. Massachusetts to Florida. See Fig. 495.

L. pedatum (pedate). A synonym of *L. dichotomum*.

L. polymorphum (many-formed). A synonym of *L. venustum*.

L. polystachyum (many-spiked). *primary petiole* short or obsolete; *secondary* ¼in. to 1½in. long; pinnules 8in. to 12in. long, 4in. to 6in. broad; segments uniform, nine to twelve on each side, 2in. to 3in. long, ¼in. broad, articulated at base, pinnatifid more than half-way down to the rachis into close, entire, blunt lobes, ⅛in. broad; upper segments sessile, lower ones short-stalked. Malay Peninsula.

L. reticulatum (reticulated).* *primary petiole* ⅛in. to ¼in. long; *secondary* ¼in. to ½in. long; pinnules 6in. to 9in. long, 4in. to 6in. broad, with a terminal segment, and four to six nearly uniform ones on each side, which are cordate-hastate or ligulate-oblong, rounded or cordate at the base, 2in. to 3in. long, ½in. to ¾in. broad, all articulated at the base, the lowest short-stalked. *spikes* one to three lines long, in close rows along the edge of the segments. Polynesian Isles, &c. SYNS. *L. Forsteri*, *L. Schkuhri*, *Hydroglossum reticulatum*, and *Lygodictyon Forsteri*.

L. scandens (climbing).* *primary petiole* very short; *secondary* ¼in. to ½in. long; pinnules 4in. to 8in. long, 2in. to 4in. broad, with a terminal segment and four or five on each side, which are very variable in shape, usually simple, ovate or ligulate-oblong, with a rounded or cordate base, sometimes hastate or even slightly pinnate below, always articulated on a short petiole, spreading from the rachis at right angles. *spikes* one to three lines long, in close rows along the edge of the segments. South China to Ceylon, &c. SYN. *Ophioglossum scandens*. *L. microphyllum* is a common form, with short broad segments.

L. scandens (climbing), of Schkuhr. A synonym of *L. volubile*.

L. Schkuhri (Schkuhr's). A synonym of *L. reticulatum*.

L. venustum (pleasing).* *primary petiole* very short; *secondary* ¼in. to ½in. long; pinnules 6in. to 12in. long, 4in. to 6in. broad, with a terminal segment, and four to twelve on each side, which are simple, ligulate-oblong, the lower ones usually hastate or pinnate below, all articulated at the base, bluntly lobed at the edge when barren, the upper ones sessile, the lower ones on a spreading petiole, ⅛in. to ¼in. long. *spikes* one to four lines long, in close rows. West Indies to Peru, 1845. SYN. *L. polymorphum*.

Lygodium—*continued.*

L. volubile (twining).* *primary petiole* nearly or quite obsolete; *secondary* about 1in. long; pinnules 8in. to 12in. long, 6in. to 10in. broad, with a simple broad, ligulate-oblong, terminal segment, 3in. to 6in. long, 1in. to 1¼in. long, and three to five like it on each side, truncate or sub-cuneate, articulated at the base, and all distinctly stalked. *spikes* one to three lines long, in close rows along the edge of the leafy segments. West Indies and Mexico to Brazil and Peru, 1810. SYNS. *L. hastatum*, *L. scandens*.

FIG. 495. LYGODIUM PALMATUM.

LYONIA (named in honour of John Lyon, a collector of North American plants). ORD. *Ericaceæ*. This genus, formerly included under *Andromeda*, comprises about eight species of hardy or greenhouse trees or shrubs. They are natives of North America, Mexico, Jamaica, and Cuba. Flowers small, in fascicles or racemes, sometimes paniculate, axillary; corolla urceolate or globose, pubescent, four or five-dentate; teeth recurved. Leaves alternate, petiolate, persistent or deciduous, entire or obscurely serrulate. Lyonias succeed best in peat or sandy loam. Propagation is effected by layers; or by seeds, which, being extremely small, require careful sowing in a sandy-peat soil.

L. ferruginea (rusty-coloured). *fl.* white; pedicels aggregate, axillary. April and May. *l.* coriaceous, stiff, crowded, on short petioles, cuneate-lanceolate, acute, quite entire, convex, with revolute edges. *h.* 20ft. Carolina to Florida, 1774. Whole plant clothed with brown, umbilicate, furfuraceous scales. Low greenhouse shrub. SYN. *Andromeda rigida* (under which name it is figured in L. B. C. 430).

L. jamaicensis (Jamaica). *fl.* white; corolla oblong. July. *l.* bluntish, evergreen, glabrous, lanceolate or elliptical-lanceolate, quite entire or repand, reticulated with veins, and at length punctate beneath. Jamaica. Greenhouse shrub. (B. M. 4273.)

Lyonia—*continued.*

L. ligustrina (Privet-like). *fl.* white, small, in pedunculate clusters; corolla nearly globose; floriferous branches terminal, panicled, nearly naked. June. *l.* obovate-lanceolate, sub-acuminated at both ends, almost entire. *h.* 3ft. to 10ft. North America, 1748. Hardy shrub. SYNS. *L. paniculata* (W. D. B. 37) and *Andromeda paniculata.*

L. paniculata (panicled). A synonym of *L. ligustrina.*

LYONSIA (named after Israel Lyons, 1739-1775, Professor of Botany at Oxford, and author of a Flora of Cambridge). ORD. *Apocynaceæ.* A genus comprising about thirteen species of twining shrubs or sub-shrubs, of which one is a native of New Caledonia, one inhabits the Fiji Islands, and the rest are Australian. *L. straminea*, the only species yet introduced, is a greenhouse evergreen twiner, allied to *Parsonsia.* It thrives in a compost of sandy peat, to which may be added a small quantity of fibry loam. Increased, during April, by cuttings of the young shoots, placed in sand, under a hand glass.

L. straminea (straw-coloured). *fl.* striped, small; corolla funnel-shaped, with a five-parted, recurved, bearded limb; cymes terminal, trichotomous. June. *l.* shortly-stalked, ovate-lanceolate or lanceolate, glabrous. New South Wales, &c., 1820.

LYPERIA (from *lyperos*, sad or sorrowful; alluding to the dull, heavy colour of the flowers). ORD. *Scrophularineæ.* A genus comprising about thirty species of greenhouse herbs or sub-shrubs, of little ornamental value. All are natives of South Africa. Flowers axillary, or in terminal spikes or racemes, usually more or less viscous. Lower leaves opposite; upper ones alternate, toothed or much cut, often tufted in the axils, sometimes minute, blackening in drying. This genus is allied to **Zaluzianskia** (which *see* for culture).

L. pedunculata (long-peduncled). *fl.* white; calyx three to four times shorter than the corolla tube; limb of corolla a trifle shorter than the tube; pedicels over 1in. long, axillary, filiform. June to November. *l.* petiolate, sub-fasciculate, obovate-cuneate, deeply toothed. *h.* 1½ft. 1790. Plant suffruticose, divaricately branched, finely pubescent. (A. B. R. 84, under name of *Buchnera pedunculata.*)

LYRATE. Shaped like a lyre. A leaf is Lyrate when its apex is rounded and there are several small lateral lobes towards its base.

LYSANTHE. Included under **Grevillea** (which *see*).

LYSIMACHIA (*Lusimachion*, the old Greek name, from *lysis*, dissolving, concluding, and *mache*, strife; in reference to the supposed soothing qualities of the plant). Loosestrife. Including *Lubinia.* ORD. *Primulaceæ.* A genus comprising about sixty species of greenhouse or hardy, erect or creeping, glabrous or pubescent, slender or robust herbs, often gland-dotted, mostly natives of the temperate and sub-tropical regions of the Northern hemisphere, while a few are found in tropical and Southern Africa, Australia, the Pacific Islands, and South America. Flowers white, yellow, or rosy, rarely purple or blue, very rarely four-parted, axillary or terminal, solitary, racemose, or in simple corymbose umbels or paniculate racemes; corolla hypogynous, funnel-shaped or rotate, five-parted; tube short or very short; lobes five or six, erecto-patent or spreading, entire or toothed; calyx five or six-parted. Leaves opposite, alternate or whorled, sessile or petiolate, entire. The species are all of easy culture, most of them thriving best in a moist situation, such as the margins of streams and ponds. Propagated very freely by divisions, in late autumn or early spring. Except where otherwise stated, the species described below are hardy, and all of them are perennials.

L. angustifolia (narrow-leaved). A form of *L. lanceolata.*

L. atropurpurea (dark purple).* *fl.* very dark purple, disposed in elegantly-drooping racemes. Summer. *l.* fleshy, smooth, obovate. *h.* [illegible] South Europe, 1820. Plant erect. SYN. *Lubinia atropurpurea.*

L. azorica (Azorean). *fl.* yellow; peduncles axillary, solitary, one-flowered; segments of calyx subulate. June. *l.* ovate-lanceolate. *h.* 4in. Azores, 1835. Half-hardy. (B. M. 3273.)

Lysimachia—*continued.*

L. barystachys (strong-spiked).* *fl.* white, small, disposed in dense, erect, terminal, crowded racemes. *l.* lanceolate. China. Plant erect. (R. H., March, 1881.)

L. capitata (headed). A synonym of *L. thyrsiflora.*

L. ciliata (ciliated).* *fl.* light yellow; corolla longer than the calyx. July. *l.* lanceolate-ovate, 3in. to 6in. long, tapering to an acute point, rounded or heart-shaped at base, all on long and fringed petioles. Stem erect, 2ft. to 3ft. high. North America, 1732. (Sy. En. B. 1143.)

L. clethroides (Clethra-like).* *fl.* white, about ½in. across, somewhat star-shaped, disposed in one-sided spikes, nearly 1ft. in length. July to September. *l.*, radical ones spathulate, cauline ones broadly lanceolate, 3in. to 5in. long, entire. *h.* 3ft. Japan, 1869. Plant erect.

L. ephemerum (transient). *fl.* white, with a dark eye, rather small, in terminal, erect racemes. Summer. *l.* linear-lanceolate, glaucous. *h.* 2ft. to 3ft. South-western Europe, 1730. Plant erect. (B. M. 2346.)

L. hybrida (hybrid). A form of *L. lanceolata.*

L. lanceolata (lance-shape-leaved). *fl.* yellow, solitary, axillary, on slender, drooping peduncles; petals slightly notched. Early summer. *l.* glabrous, linear or oblong-lanceolate. *h.* 1ft. to 1½ft. North America. *L. angustifolia*, with a more branching habit and narrow leaves, and *L. hybrida*, with broader foliage, are forms. This species and its varieties are of erect habit.

L. Leschenaultii (Leschenault's). *fl.* brilliant carmine. Autumn. *l.* lanceolate, acute, sometimes opposite or ternate, at others alternate. Stem branching, tufted. *h.* 1ft. India. A half-hardy erect-growing species, but it does well in the rock-garden, in a sandy soil. (F. d. S. 982.)

L. Nummularia (Moneywort).* Creeping Jenny; Moneywort. *fl.* bright yellow, large, about 1in. across, very showy, solitary, axillary, with broad sepals, ciliate petals, and glandular connate filaments. Summer and autumn. *l.* opposite, roundish, obtuse, glabrous. Europe (Britain). A common and handsome creeping plant, excellent for hanging baskets. (Sy. En. B. 1144.)

L. nutans (nodding). *fl.* dark purple, in terminal racemes; lobes of corolla spathulate, erosely denticulated. July and August. *l.* opposite or twin, lanceolate, a little serrated, glabrous. *h.* 2ft. Cape of Good Hope, 1823. Plant erect, half-hardy. (B. M. 4941.)

L. punctata (spotted).* *fl.* yellow; petals ovate, acute, glandular. July and August. *l.* whorled, oblong-lanceolate, stalked. *h.* 1ft. Europe and West Asia, 1820. Plant erect. (B. M. 2295, under name of *L. verticillata.*)

L. thyrsiflora (thyrse-flowered). *fl.* yellow, rather small, disposed in dense axillary racemes. Summer. *l.* lanceolate, acute, entire, 3in. long, ¾in. broad at the base. *h.* 1ft. to 2ft. Europe, &c. (Britain). Plant erect. This species thrives best treated as a sub-aquatic. SYNS. *L. capitata, Naumburgia thyrsiflora.* (B. M. 2012; Sy. En. B. 1140.)

L. verticillata (whorled). A synonym of *L. punctata.*

L. vulgaris (common).* Common, or Yellow Loosestrife. *fl.* yellow, in short, terminal, panicled cymes. Summer. *l.* opposite or whorled, ovate or lanceolate, acute, furnished with black glandular dots. Stems erect, branching. *h.* 2ft. to 3ft. Europe, &c. (Britain). (Sy. En. B. 1141.)

LYSINEMA (from *lysis*, freeing, and *nema*, a filament; in reference to the stamens being free). ORD. *Epacrideæ.* A genus of very pretty, greenhouse, evergreen, erect or prostrate shrubs. There are five species, all natives of Australia. Flowers white or pink, axillary, solitary; corolla salver-shaped; tube cylindrical. Leaves erect or spreading, linear-ovate or elliptic. The species described below is the only one introduced. For culture, *see* **Epacris.**

L. pungens (pungent). *fl.* white, or rarely red, sessile in the upper axils. March. *l.* ovate, acuminated, spreading, stem-clasping. *h.* 2ft. to 3ft. New South Wales, &c., 1804. (B. M. 1199, under name of *Epacris pungens.*)

LYSIONOTUS (from *lysis*, loosening, freeing, and *notos*, the back; in reference to the capsule opening with elasticity from the dorsal suture). ORD. *Gesneraceæ.* A genus comprising three (or perhaps four) species of glabrous or pubescent stove herbs, natives of the Himalayas and China. Corolla purplish or pale violet; tube elongated; cymes at the tops of the branches, or in the axils of the upper leaves, long or shortly pedunculate. Leaves ternate, verticillate, membranaceous or coriaceous, toothed or entire. Stems or rhizomes creeping, sub-erect, simple or shrubby-branched. Probably the only species yet introduced is *L. serrata.* This thrives in a peat and loam soil. Propagated, in spring, by divisions; or by seeds, sown in sandy soil, or on a hotbed.

Lysionotus—*continued.*

L. serrata (serrate-leaved). *fl.* pale lavender, with veins of a deeper colour, irregularly funnel-shaped, about 2in. long; corymbs pedunculate, five to ten-flowered. Winter. *l.* oblong-lanceolate, acuminated, coriaceous, serrated, reticulately veined. *h.* 1ft. Sub-tropical Himalayas, 1882. Plant erect. SYN. *L. ternifolia.* (B. M. 6538.)

L. ternifolia (ternate-leaved). A synonym of *L. serrata.*

LYTHRARIEÆ. A natural order of herbs, shrubs, or trees, with variable habit, natives chiefly of tropical America. Flowers hermaphrodite, very rarely unisexual, regular or rarely irregular, solitary in the axils of the leaves, or fascicled or cymose, sometimes spiked or racemed, and accompanied by floral bracteiform leaves, rarely panicled; calyx very often free, persistent, tubular or campanulate, rarely urceolate. Leaves opposite or whorled, rarely opposite and alternate on the same plant, simple, penninerved, entire, petioled or sessile, sometimes glandular dotted, always exstipulate. There are about thirty genera and 250 species. Illustrative genera are: *Cuphea, Grislea, Lythrum.*

LYTHRUM (from *lythron*, black blood; alluding to the colour of the flowers in some species). Loosestrife. ORD. *Lythrarieæ.* A genus comprising about twelve species of hardy or nearly hardy herbaceous plants or small shrubs. Flowers pink, purple, or rarely white, in the axils of the leaves, solitary, or in few-flowered, aggregate cymes. Leaves opposite, rarely verticillate or alternate, linear-oblong or lanceolate, entire. The species are of easy culture in ordinary garden soil, and may be freely increased by divisions. *L. Græfferi* is a very ornamental trailing plant, well adapted for cultivating in hanging pans or baskets for greenhouse decoration in summer. It may readily be increased by cuttings.

L. alatum (winged). *fl.* of a beautiful purple, almost sessile, erect, six-petaled, furnished with two minute bracts. Summer and autumn. *l.* opposite, ovate-oblong, acute, rather cordate at the base, sessile, or nearly so. Branches twiggy, tetragonally winged. *h.* 1ft. to 4ft. North America, 1812. An elegant half-shrubby plant, thriving best in sandy soil. (B. M. 1812.)

L. Græfferi (Græffer's).* *fl.* solitary in the axils of all the upper leaves, shortly pedicelled; calyx ¼in. long; tube slender; lobes twelve; petals longer than the calyx, bright pink. Summer and autumn. *l.* ¼in. to 1in. long, all alternate, or the lower ones opposite, more or less oblong, or linear-oblong. *h.* 1ft. to 3ft. South Europe. (B. M. 6499.)

L. roseum (rose-coloured). A variety of *L. Salicaria.*

L. Salicaria (Willow-like).* Common Purple Loosestrife. *fl.* reddish-purple, in whorled leafy spikes, almost sessile; petals six or seven. July. *l.* opposite, lanceolate, cordate at the base. *h.* 2ft. to 5ft. England. A handsome native perennial, growing freely on the margins of streams and lakes. Its varieties are frequently very desirable, especially *roseum* and *superbum.*

L. superbum (superb). A variety of *L. Salicaria.*

L. virgatum (twiggy). *fl.* purple, in threes, axillary, distinctly pedicellate; panicle twiggy. Summer. *l.* lanceolate, attenuated at the base. *h.* 2ft. to 3ft. Tauria, &c., 1776. Perennial. (B. M. 1003.)

MAACKIA AMURENSIS. *See* **Cladrastis amurensis.**

MABA (its native name in the Tonga Islands). Including *Ferreola.* ORD. *Ebenaceæ.* A genus comprising fifty-nine species of (mostly) hard-wooded, stove, evergreen trees or shrubs, dispersed over the warmer regions of the globe. Flowers dicœcious, rarely monœcious or polygamous, axillary, or at the nodes of the year-old or older branches, solitary or shortly cymose; calyx campanulate; corolla campanulate or tubular; lobes three, rarely four to six, contorted. Leaves alternate, often smaller than in *Diospyros*, rarely large. Mabas thrive in a peat and loam compost. Propagated, during May, by cuttings of half-ripened shoots, placed in sand, under a glass, and in a very gentle bottom heat. Probably the undermentioned are the only species introduced.

M. buxifolia (Box-leaved). *fl.* yellowish, solitary or aggregate. *l.* obovate, glabrous in the adult state. *h.* 1½ft. Tropical Asia and Africa, 1810.

Maba—*continued.*

M. laurina (Laurel-like). *fl.* yellow, solitary. July. *l.* oval-oblong, veiny, bluntish at the base, shining. *h.* 3ft. Queensland, 1824.

MACADAMIA (named after John Macadam, M.D., Secretary of the Philosophical Institute of Victoria). ORD. *Proteaceæ.* A small genus (two species) of greenhouse evergreen trees or tall shrubs, confined to Eastern Australia. Flowers pedicellate, in pairs, in simple, terminal or axillary racemes; perianth regular or slightly irregular. Leaves verticillate, entire or serrated. For culture, *see* **Hakea.**

M. ternifolia (ternate-leaved).* *fl.* not showy, in a long-stalked raceme. *fr.* a kind of drupe, with a fleshy exterior, encircling a hard shell, like a Walnut; it contains, at maturity, a kernel of a remarkably rich and agreeable flavour, resembling, although much superior to, the Filbert. *l.* in whorls of three or four, short-stalked, leathery, shining, oblong or oblong-lanceolate, entire or dentate at the margin, from 4in. to 12in. long. *h.* 30ft. 1869. Tree. (G. C. 1870, 1131.)

MACHÆRANTHERA. This genus is now included under *Aster.*

MACHÆRIUM (from *machaira*, a sabre; in allusion to the pods ending in a sabre-shaped wing, which is longer than the fruit). ORD. *Leguminosæ.* A genus comprising nearly sixty species of stove erect trees or tall climbing shrubs, natives of tropical America. Flowers purple, violet, or white, small or mediocre, disposed in short, side-flowering racemes, fasciculate in the axils, or in terminal crowded panicles; calyx truncate, obtuse at base, shortly toothed; standard broadly ovate or orbiculate, exappendiculate, often silky outside; wings oblong, frequently falcate; keel incurved, the petals connate at back; pedicels short, sometimes very short. Pod compressed, samara-like, indehiscent. Leaves impari-pinnate; leaflets mostly alternate, exstipellate; stipules sometimes hard-bristly; bracts small; bracteoles persistent. Some of the species are supposed to yield a part of the rosewood of commerce. Machæriums grow well in a compost of loam and peat. Propagation may be effected by cuttings, made of the ripened wood, and inserted in sand, under a glass, in heat. The undermentioned are probably the only species introduced; they are usually, but erroneously, classed as Nissolias. Both are climbing shrubs.

M. aculeatum (prickly). *fl.* white; panicles short, darkly pubescent; standard silky; keel much shorter than the wings. August. *l.*, leaflets thirty-one to forty-five, narrow-oblong, about ½in. long, obtuse or retuse, shining, slightly pilose beneath, coriaceous; stipules at length hard-spinescent. *h.* 10ft. Rio Janeiro, 1824.

M. robiniæfolium (Robinia-leaved). *fl.* white, disposed in axillary, many-flowered racemes, which are shorter than the leaves; keel slightly rostrate; calyx somewhat glabrous. July. *l.*, leaflets about twenty or thirty, oblong, obtuse, mucronulate, very glabrous; stipules spinescent. *h.* 6ft. St. Vincent, 1824.

MACKAYA (named after Dr. J. F. Mackay, author of the "Flora Hibernica"). ORD. *Acanthaceæ.* A monotypic genus, now included, by Bentham and Hooker, under *Asystasia. M. bella* is a beautiful greenhouse plant, which grows very freely, but requires special treatment to induce it to flower profusely. A knowledge of its habit and mode of flowering is of material assistance, if not indispensable, for attaining success in its cultivation. Essential points are the encouragement of a free growth throughout the summer, in an airy, light structure, and the allowance of a season of rest in winter, during which time no water should be applied to the roots, or overhead. The plant is nearly, or quite, deciduous, and the racemes of flowers are produced from the points of nearly all well-ripened shoots. Cuttings root readily, during summer, in any close frame; and young plants, thus obtained, should be grown on as rapidly as possible until the approach of winter. An occasional pinching will encourage a bushy habit, and cause new shoots to proceed from the base of the plant. Plenty of water, and frequent syringings, should be applied in the growing season, and a position afforded,

Mackaya—*continued.*

in a house or frame, where plenty of light and air may be admitted. Under such treatment, compact little plants, in 5in. pots, may be obtained by November. These should be kept quite dry until April, when they may be cut back and started in preparation for flowering the following year. When new growth begins, the plants should be transferred into 8in. pots, using a somewhat rough, rich soil, composed of about two parts loam to one of dried cow-manure. Another potting into 10in. sizes may be given in due course, and plants grown in them 3ft. high, by autumn. Dry off as before, and encourage the flowers to expand gradually, in spring, in a temperature of about 60deg., and, when they commence opening, the plants should be transferred to a greenhouse which is some 10deg. cooler. It is important that the wood be thoroughly ripened, and all the points preserved until flowering is past, when similar treatment may be again given, if desired for the next year. It is, however, advisable to propagate and prepare a few new ones each season, to preserve a stock of healthy young plants. Brown Scale is frequently very troublesome; it must be removed from the stems or leaves by sponging with rather strong soft-soap water or some other insecticide.

M. bella (handsome).* *fl.* pale lilac, nearly 2in. long, campanulate, with two of the four stamens barren, throat ornamented with most delicately-pencilled, reticulated, purple veins; racemes many-flowered, 4in. to 6in. long. May. *l.* ovate-oblong, sinuately toothed. Branches virgate. *h.* 6ft. Natal, 1863. (B. M. 5797.)

MACLEANIA (named after John Maclean, of Lima, a British merchant, and a distinguished patron of botany). Ord. *Vaccinieæ*. A genus comprising about a dozen species of ornamental, glabrous or rarely puberulous, greenhouse shrubs, inhabiting the Andes of America, from Peru to Mexico. Flowers showy, solitary, corymbose, or in axillary fascicles; corolla cylindrical, with a five-toothed limb; anthers one-celled. Leaves alternate, shortly petiolate, entire, persistent. For culture, *see* **Thibaudia.**

M. angulata (angled). *fl.* in threes from the axils, pedunculate; corolla bright red, 1in. long, with a yellow limb; calyx angled. June. *l.* alternate, ovate, entire, obtuse, on short petioles; those on the young shoots tinged with red. *h.* 3ft. Peru, 1842. A beautiful evergreen shrub. (B. M. 5670.)

M. longiflora (long-flowered). *fl.* borne in threes from the axils; corolla red, angular, with a yellow limb. May. *l.* sessile, oval-oblong, obtuse. *h.* 3ft. Peru, 1843. (B. R. xxx. 25.)

M. pulchra (beautiful).* *fl.* yellow, with bright deep scarlet tubes, large, pendulous, produced in clusters upon a short axillary peduncle. April. *l.* oblong, obtuse at the base, slightly emarginated, deep shining green, beautifully tinged with red when young. New Grenada, 1874. A handsome plant, with long, drooping branches. (B. M. 6464.)

M. punctata (dotted). *fl.* pedunculate, crowded in the upper axils; corolla pendent, 1in. long, swollen in the lower half; the upper part white, tinged with yellow; calyx tubulate, deep red. November. *l.* alternate, inclining to secund, cordate, sessile or shortly petiolate, upper ones nearly oval, glossy, dotted. Ecuador, 1864. A low shrub. (B. M. 4439.)

M. speciosissima (very showy).* *fl.* brilliant scarlet, with yellow points, upwards of 1in. long, tubular, pendulous, produced freely in axillary clusters. Early spring. *l.* somewhat oblong, obtuse, tinged with red when young. Colombia, 1864. This beautiful shrub is not of compact habit, and should be suspended from the roof, or grown upon a shelf, so that its branches may hang downwards. (B. M. 5453.)

MACLEAYA YEDOËNSIS. *See* **Bocconia cordata.**

MACLURA (named in honour of W. Maclure, a North American naturalist, who died in 1840). Ord. *Urticeæ*. A monotypic genus. The species is a hardy, deciduous, milky-juiced tree. For culture, &c., *see* **Morus.**

M. aurantiaca (golden).* Bow-wood; Osage Orange. *fl.* yellowish-green, monœcious. *fr.* from 3in. to 5in. in diameter, bright golden-yellow. *l.* ovate, acuminate, bright shiny green, smooth, 3in. to 5in. long, and 2in. broad. *h.* 20ft. North America, 1818. An excellent plant for forming hedges, being armed with short spines.

M. tricuspidata (three-cusped). *fl.* axillary. *l.* three-lobed while young, roundish-ovate in adults. China, 1872. An ornamental, hardy, deciduous tree, remarkable from its juvenile (non-flowering) state (see Fig. 496) exhibiting such a contrast to the adult (flowering) state (see Fig. 497, page 313). This plant is *Cudrania triloba*; but, as it was omitted in Vol. I. of this work, and is so well known under the name given it by Carrière it is included here. In China, the leaves are used for feeding silk-worms, and the wood yields a yellow dye.

FIG. 496. BRANCH, IN JUVENILE STATE, OF CUDRANIA TRILOBA (MACLURA TRICUSPIDATA).

MACODES (from *makòs*, length; in reference to the shape of the labellum). Ord. *Orchideæ*. A monotypic genus. The species is a stove orchid, closely allied to **Anœctochilus** (which *see* for culture).

M. Petola (Petola). *fl.* greenish, small, externally clothed with glandular pubescence. *l.* oval, 2in. to 3in. long, and 2in. broad, clouded on the upper surface, and elegantly marked with netted golden veins. Java, 1859. A very beautiful little plant, of which there are two forms. (R. X. O. 96, Fig. 1.)

MACRADENIA (from *makros*, long, and *aden*, a gland; referring to the long process of the pollen-masses). Syn. *Rhynchadenia*. Ord. *Orchideæ*. A genus comprising only two or three species of stove epiphytal orchids, confined to the West Indies, and differing from *Oncidium* in mere technical details. They are rather more curious and interesting than beautiful. For culture, *see* **Oncidium.**

M. Brassavolæ (Brassavola).* *fl.*, sepals and petals cinnamon, margins ochre-coloured; lip trifid, side lobes rhomboid, middle very large, cuspidate, white, with purple streaks, with yellow borders to the side lobes; peduncle densely flowered. *l.* one or two, oblong, acute, 5in. long, 2in. broad. Columbia, 1864.

M. lutescens (yellowish). *fl.* dingy yellow, spotted with brownish-purple; lip undivided, cucullate-concave, taper-pointed; peduncle four or five-flowered. November. *l.* solitary. Trinidad, 1843. (B. R. 832.)

MACRANTHUS. Included under **Mucuna** (which *see*).

MACROCHLOA. Included under **Stipa** (which *see*).

MACROCNEMUM (from *makros*, long, and *kneme*, a leg; in reference to the long flower-stalks). Syn. *Lasionema*. Ord. *Rubiaceæ*. A genus comprising about nine species of stove trees and shrubs, inhabiting tropical America and the West Indies. Flowers white or pink,

Macrocnemum—*continued.*

in axillary and terminal panicles; pedicels bracteolate; corolla funnel-shaped or salver-formed; tube sub-elongate. Leaves opposite, petiolate. The only species yet introduced is the one here described. For culture, *see* **Catesbæa.**

M. jamaicense (Jamaica). *fl.* greenish-white, scented; corymbs on long peduncles. *l.* oblong-oval, petiolate, polished. *h.* 10ft. to 15ft., or sometimes a tree 30ft. high. Jamaica, 1806.

MACROGLOSSA STELLATARUM, or **HUMMING-BIRD HAWK MOTH.** This moth is of interest to gardeners, chiefly because of the part it plays in fertilising the young seeds in Honeysuckle and other plants in which the flowers have long, narrow tubes. In such flowers, the honey, which is the lure for insect visitors, is at the bottom of the tube, and is within reach only of those insects that have a long proboscis. Through this organ the honey is sucked up, but, to reach the latter, the head has to be thrust deep into the flower; and, in doing this, the insect carries off some of the pollen on its head or back. The parts thus dusted with pollen are almost certain to touch the stigma of the next flower visited; and the pollen grains adhere readily to the sticky surface of the stigma, whereon the insect's share in the work of fertilisation is completed. Some idea of the size, form, and markings of *M. stellatarum* may be formed from Fig. 498. The front wings are smoky, with a black central dot, and dark cross-bars. The hind wings are orange-coloured, with the base and margin dark. The

FIG. 498. MACROGLOSSA STELLATARUM.

Macroglossa stellatarum—*continued.*

body is of a smoky hue, with black and white spots on the hinder part, where also there are black and white tufts on the sides, and a tuft of black hairs at the end of the body. These tufts are spread during flight, considerably increasing the apparent breadth of the body. The flight is very rapid, the moth dashing from flower to flower, remaining poised on the wing before each, while it sucks out the nectar, and unconsciously transfers the pollen from flower to flower. In mode of flight, in the loud humming noise that it emits while poised before a flower, and even in its general appearance, it so much resembles a Humming Bird as to well deserve the popular name of Humming-bird Hawk Moth. Like the bird named, it flies only by day, and most actively during bright sunshine, in this respect differing from most of the group of Hawk Moths. The caterpillar, like those of other Hawk Moths, has a slender, sharp horn on the end of the body, resembling a short, erect tail. It is green, or pinkish-brown, sprinkled with white; the sides are bluish, with two dull white or pinkish lines along each. The caterpillar feeds on Lady's Bedstraws (*Galium*) of different kinds, and cannot be said to do any damage in gardens. When full fed, it burrows underground, and turns into a brown chrysalis.

FIG. 497. BRANCH AND FRUIT, IN ADULT CONDITION, OF CUDRANIA TRILOBA (MACLURA TRICUSPIDATA, see page 312).

MACROMERIA (from *makros*, large, and *meris*, a part; the flowers of this genus are the largest in the whole family). ORD. *Boragineæ.* A genus comprising about eight species of half-hardy perennial herbs, natives of Mexico, Columbia, and Peru, allied to *Onosmodium* and *Lithospermum*, from the latter of which it is distinguished by the exserted stamens, and by having the corolla with a long tube, dilated at the throat. Racemes terminal, few-flowered, bracteate. Leaves alternate, sessile, lanceolate. *M. exserta* is probably the only species yet introduced. For culture, *see* **Lithospermum.**

M. exserta (exserted). *fl.* yellow, racemose; style and stamens much exserted. Autumn. *l.* lanceolate, mucronate, scabrous. *h.* 3ft. Mexico, 1846. (B. R. 1847, 26.)

MACROPIPER. Included under **Piper** (which *see*).

MACROPLETHUS. Included under *Acrostichum.*

MACROS. A Greek term, which, used in compounds, signifies long, and sometimes large.

MACROSIPHON. A synonym of **Hindsia** (which *see*).

MACROSTYLIS (from *makros*, long, and *stylos*, a style; style very long). ORD. *Rutaceæ.* A genus comprising eight species of pretty, greenhouse, evergreen shrubs, indigenous to South Africa. They are closely allied to *Diosma.* Flowers sub-umbellately aggregate at the tips of the branches; peduncles short, bracteate at base. Leaves scattered, alternate, and opposite, dotted, somewhat keeled. For culture, *see* **Agathosma.**

M. barbigera (beard-bearing). *fl.* reddish, with a white beard; corymbs terminal, almost sessile. April. *l.* opposite, cordate, stem-clasping, acute. *h.* 1ft. to 2ft. 1826.

M. squarrosa (squarrose). *fl.* reddish; petals longer than the calyx. May. *l.* crowded, ovate or ovate-oblong, obtuse, much-spreading. *h.* 1ft. to 2ft. 1774. SYN. *Diosma obtusa.*

MACROTROPIS. This genus is included under **Ormosia** (which *see*).

MACROZAMIA (from *makros*, long, and *Zamia*, to which it is closely allied). Including *Catakidozamia* and *Lepidozamia.* ORD. *Cycadaceæ.* A genus comprising about seven species of greenhouse evergreen perennials, restricted to tropical and temperate Australia. Cones of both sexes ovoid, oblong, or cylindrical, or females rarely nearly globular; scales hard, thickened at apex, with an erect, spreading, or rarely recurved point, either broad and short or elongated and narrow; scales of females with one pendulous ovule on each side. Leaves and trunk similar to *Cycas*, except that the pinnæ have no midrib, and are striate with parallel veins. The species thrive in a compost of two parts well-drained sandy loam and one of peat. For general culture, *see* **Zamia.**

M. corallipes (red-stalked).* *l.* forming a very contracted crown, and diverging below, then sub-erect; petiole deep green, smooth, but not polished, reddish-brown towards the base; pinnæ about fifty pairs, 5in. to 7in. long, ⅛in. broad, very narrow, linear-lanceolate, acute, but hardly pungent, dark green, with a bright red petiolule. Trunk sub-spherical. 1872. A very remarkable and ornamental plant. Probably a form of *M. spiralis.* (B. M. 5945.)

M. cylindracea (cylindric). *l.* dark green, pinnate, coriaceous; pinnæ glossy on the surface, each being marked at the base with a large ivory-white patch, which strongly contrasts with the dark green midrib lying between the two rows of ivory markings. Stem with a long neck. 1874. Distinctly and well marked, but probably a form of *M. spiralis.*

M. Denisonii (Denison's). A synonym of *M. Perowskiana.* The same name is sometimes applied, in gardens, to *M. P. Hopei.*

M. Fraseri (Fraser's).* *l.* pinnate, pendulous, 6ft. to 8ft. long; pinnæ linear, tapering to a fine spiny point, swollen at the base, forming a joint or umbo, light green or greenish-white, about 6in. long, and scarcely ¼in. broad; upper surface almost black-green, the under side dark green. Stem about 4ft. or 5ft. in circumference. 1846. A very handsome and distinct species.

M. Mackenzii (Mackenzie's). *l.* ovate in outline, with numerous pairs of narrow tapering segments of a dark green colour, and from 9in. to 10in. in length; base of petiole covered with loose floccose wool; rachis strongly convex behind, slightly so in front, with the segments of the central portion set on at about ½in. apart, the upper ones being more closely, and the lower ones more distantly, placed. 1877. (G. C. n. s., vii. 665.)

M. Macleayi (Macleay's). A synonym of *M. Perowskiana.*

M. Miquelli (Miquell's). *l.* 2ft. to 4ft. long; base of petiole loosely woolly; upper surface of rachis flat, and often ½in. broad in the lower part; pinnæ straight or falcate, contracted and callous at base and their insertion at the rachis marginal, the lowest often reduced to small teeth. *male cones* cylindrical, 6in. to 9in. long, 2in. to 2½in. thick. *female cones* about as long and thicker, the scales fewer.

M. Perowskiana (Peroffski's).* *l.* dark green, ovate, horizontal, on long stalks, linear, decurved, acuminate. Trunk stout, short, scaly, supporting a crown of leaves. 1870. This species is only known to us in its young state, but has the appearance of being most desirable and beautiful. SYNS. *M. Denisonii, M. Macleayi, Catakidozamia Macleayi,* and *Lepidozamia Peroffskiana.* (R. G. 660.)

Macrozamia—*continued.*

M. P. Hopei (Hope's). *l.* pinnate, 3ft. to 6ft. long; pinnæ entire, linear, 6in. to 12in. long, scarcely 1in. broad, dark green above, tinged with red at the base, paler below; petioles glaucous when young. Stem slender, about 1ft. in diameter in mature plants. 1865. A noble variety, attaining a height of 60ft. in its native country; but it is of very slow growth, and does not rapidly form a stem. SYNS. *M. Denisonii* (of gardens) and *Catakidozamia Hopei.*

M. plumosa (plumed).* *l.* erect, spirally-twisted, from 2ft. to 2½ft. long, furnished nearly to the base with narrow-linear leaflets, which are set on at intervals of about ¼in., and are from 6in. to 8in. long; petiole flattened. Stem small, ovate with woolly scales. 1874. A very beautiful plant, remarkable for its distinct and elegant character. (G. C. n. s., iii. 653.)

FIG. 499. MACROZAMIA SPIRALIS.

M. spiralis (spiral). *l.* pinnate, 1ft. to 3ft. long; pinnæ linear, bright shining green, except at the base, where they are ivory-white, forming a broad central white stripe. A very handsome plant, known to us only in its young state. See Fig. 499.

MACULATE. Spotted or blotched.

MADAGASCAR NUTMEG. *See* **Agathophyllum.**

MADARIA. Included under **Madia** (which *see*).

MADAROGLOSSA. A synonym of **Layia** (which *see*).

MADDER. The root of **Rubia tinctoria** (which *see*).

Madeira Vine See Page 206 Pt 1

MADIA (the Chilian name of *M. sativa*). SYN. *Biotia.* Including *Madaria.* ORD. *Compositæ.* This genus comprises about eight species of hardy, annual, erect herbs, natives of North-west America and Chili. Flower-heads yellow, sessile or pedunculate at the apices of the branches, solitary, clustered, or loosely paniculate; involucre ovoid or campanulate. Leaves alternate, entire or merely toothed. The species will thrive in any ordinary garden soil. Propagated by seeds, sown in spring.

M. elegans (elegant).* *fl.-heads* yellow; disk-florets bearded in the limb; receptacle conical, pilose. August. *l.* linear or lanceolate, mostly entire. Stems diffuse. *h.* 1½ft. North-west America, 1831. (B. M. 3548; B. R. 1458.)

M. sativa (cultivated). *fl.-heads* yellow. July. *l.*, lower ones opposite, entire; upper ones alternate. *h.* 1ft. Chili, 1794.

M. viscosa (clammy). *fl.-heads* yellow; outer involucres ten-leaved. July and August. *l.* lanceolate, sessile, viscid. *h.* 1½ft. Chili, 1794. (B. M. 2574.)

MADWORT. *See* **Alyssum.** The name is also given to *Asperugo.*

MÆRUA (said to be derived from *Meru*, the Arabian name). ORD. *Capparideæ.* A genus comprising about half-a-score species of stove or greenhouse, unarmed, often glaucous shrubs, natives of tropical Africa, Arabia, and the West Indies. Flowers axillary or terminal, solitary, corymbose, or racemose; calyx funnel-shaped, with a persistent tube and four lobes, valvate, deciduous; petals none, or four, inserted at the mouth of the calyx. Leaves simple, entire; petioles articulated with the branches; stipules small. The undermentioned species, which is probably the only one in cultivation,

Mærua—*continued.*

thrives in a compost of loam and peat. Cuttings of nearly ripened wood will root in sand, under a glass, in heat.

M. oblongifolia (oblong-leaved). *fl.* white, terminal, in simple depressed racemes; petals shorter than the calyx lobes, oblong-linear, acuminate. June. *l.* oblong-lanceolate, very obtuse and mucronulate at the apex, glaucescent, shortly petiolate, 1½in. to 2½in. long, nearly ½in. broad, *h.* 4ft. Abyssinia, 1822. Stove. SYNS. *Capparis heteroclita* and *Niebuhria oblongifolia.*

MÆSA (from *maas*, the Arabic name of one of the species). SYN. *Bæobotrys.* ORD. *Myrsineæ.* A genus of about thirty-five species of stove evergreen shrubs, natives of the tropical and sub-tropical regions of the Old World. Flowers white, small; racemes usually axillary, simple or branched, many-flowered; pedicels bracteate at base. Leaves entire, dentate or serrate, often full of pellucid dots. Probably the species here described is the only one now in cultivation. For culture, &c., *see* **Ardisia.**

M. indica (Indian). *fl.* numerous, in axillary and terminal racemes. November. *l.* from ovate to lanceolate, coarsely serrated, 3in. to 6in. long. *h.* 5ft. to 6ft. India, 1817. (B. M. 2052, under name of *Bæobotrys indica.*)

MAGNOLIA (named after Pierre Magnol, 1638-1715, Professor of Medicine, and Prefect of the Botanic Garden at Montpellier). ORD. *Magnoliaceæ.* This genus comprises about twenty species of elegant ornamental greenhouse or hardy evergreen or deciduous trees and shrubs, of which thirteen are natives of Japan, China, and the Himalayas, and the rest are North American. Flowers conspicuous, solitary, terminal; petals six to twelve, in two or more series. Leaves large, entire. Magnolias are readily increased by layering; also by seeds, which should be sown, so soon as ripe, in a frame and kept moderately moist until they germinate. Veneering and side-cleft grafting are also practicable in July and August; the stocks operated upon being placed in

FIG. 500. FLOWER AND LEAVES OF MAGNOLIA CONSPICUA.

a close frame until a union is effected. *M. conspicua* is one of the earliest and most beautiful of outside flowering trees. It, as well as several other species, should be provided with a sheltered situation, especially in the colder parts of the country. *M. acuminata* is, perhaps, the hardiest species of the genus, and forms a fine large tree. *M. grandiflora* is well adapted for planting against the wall of a house where there is a considerable space to be covered; its massive evergreen leaves and large white blossoms being especially distinct and attractive in late summer and autumn. The flowers of the majority of Magnolias emit an agreeable and strong perfume. Those of *M. fuscata*, an evergreen slow-growing greenhouse species, are very powerfully scented

Magnolia—*continued.*

when the sun shines, one or two flowers being sufficient to perfume a large house. *M. glauca*, a very desirable small-flowered hardy shrubby species, is also agreeably scented. Magnolias succeed best in warm positions, and in a moderately rich soil, which should be of a free, open texture. They are somewhat impatient of root disturbance.

M. acuminata (acuminated).* Cucumber-tree. *fl.* glaucous-green, tinged with yellow, 3in. to 4in. in diameter, scarcely scented, petals six to nine. May to July. *fr.* about 3in. long, when young somewhat resembling a small cucumber. *l.* oblong, acuminate; under surface pubescent. *h.* 30ft. to 60ft. North America, 1736. A large, vigorous, hardy, deciduous tree, with spreading branches. (B. M. 2427; L. B. C. 418.)

M. auriculata (eared). A synonym of *M. Fraseri.*

FIG. 501. FLOWERING BRANCHLET OF MAGNOLIA GLAUCA.

M. Campbellii (Campbell's). *fl.* pale rose inside, crimson outside, slightly fragrant, 6in. to 10in. in diameter. April. *l.* large, ovate-lanceolate, silky hairy beneath. Sikkim, 1868. A very handsome deciduous tree in its native habitat, but not sufficiently hardy to withstand our winters, except in the most favoured spots. It flowered outside in the South of Ireland in 1883, and again in 1885.

M. conspicua (conspicuous).* The Yulan. *fl.* white, sometimes suffused with purple, expanding during the day, very fragrant, erect, produced in great profusion; petals six to nine. February to May. *l.* obovate, abruptly acuminated, younger ones pubescent, expanding after the flowers. *h.* 20ft. to 50ft. China, 1789. A well-known and handsome hardy deciduous tree, of which there are one or two varieties in cultivation. SYN. *M. Yulan.* See Fig. 500. (B. M. 1621.)

M. c. Soulangeana (Soulange's). Probably a natural hybrid between *M. conspicua* and *M. obovata*; it has the large flowers of the former, and the purple-tinted petals of the latter species. France. (B. R. 1164, under name of *M. Yulan Soulangeana*, and S. B. F. G. 260, under name of *M. Soulangeana.*)

M. c. S. nigra (black). A form with still darker flowers.

M. cordata (cordate). *fl.* yellow, lined with purple, erect, about 4in. in diameter, scentless; petals six to nine, oblong. April to July. *l.* heart-shaped, somewhat ovate, acute, from 4in. to 6in. long; under surface tomentose, upper surface smooth. *h.* 40ft. to 50ft. North America, 1801. Hardy deciduous tree. (L. B. C. 474.)

M. Fraseri (Fraser's). Long-leaved Cucumber-tree. *fl.* yellowish-white, erect, 3in. to 4in. in diameter, very sweet-scented; petals nine, oblong. April. *l.* 1ft. or more long, smooth, under surface somewhat glaucous, spathulately-obovate, cordate at the base, with blunt, approximate auricles. *h.* 30ft. to 50ft. North America, 1786. A bold and imposing hardy deciduous species, with spongy wood. SYN. *M. auriculata.* (A. B. R. 573; B. M. 1206.)

M. fuscata (brown-stalked).* *fl.* dull purple, very fragrant, small, erect. April. *l.* elliptical-oblong, adult ones smooth, younger ones, as well as branches and petioles, covered with brown tomentum. *h.* 2ft. to 4ft. China, 1789. A greenhouse evergreen shrub. (A. B. R. 229; B. M. 1008.)

M. glauca (glaucous).* *fl.* white, very fragrant, about 3in. in diameter; petals nine to twelve, ovate, concave. May to July. *l.* elliptical, obtuse, under surface glaucous. *h.* 15ft. North America, 1688. A very desirable hardy evergreen shrub. See Fig. 501. (L. B. C. 215.)

Magnolia—*continued.*

M. g. major (larger). A form of vigorous habit, with leaves and flowers two or three times larger than those of the type. SYN. *M. Thompsoniana*, of gardens. (B. M. 2164.)

FIG. 502. FLOWERING BRANCHLET OF MAGNOLIA GRANDIFLORA.

M. grandiflora (large-flowered).* *fl.* white, sweet-scented, large, from 6in. to 8in. in diameter, erect; petals nine to twelve. Summer. *l.* oval-oblong, coriaceous, upper surface shining, under surface rusty. *h.* 70ft. to 80ft. North America, 1737. A handsome stately hardy evergreen tree, branching, and forming a fine pyramidal head. See Fig. 502. (A. B. R. 518.) There are numerous varieties, differing from the type in the shape of the leaves; they are not, as a rule, of much importance.

M. Halleana (Hall's). A synonym of *M. stellata*.

M. macrophylla (large-leaved).* *fl.* white, purple at the base, sweet-scented, 8in. to 10in. in diameter; petals six to nine, ovate, June. *l.* very large, 1ft. to 3ft. long, 3in. to 10in. broad, oblong-obovate, somewhat panduriform, cordate at the base, under surface whitish-glaucous. *h.* 30ft. North America, 1800. A very handsome hardy deciduous tree, with white smooth bark. (B. M. 2189.)

M. obovata (obovate). *fl.* purple outside, white within, large, tulip-shaped, fragrant; petals six. April. *l.* large, obovate, dark green. *h.* 6ft. Japan, 1790. A very pretty, small, hardy, deciduous shrub.

M. o. discolor (two-coloured). A form with larger flowers than the type. (B. M. 390, under name of *M. purpurea*.)

M. parviflora (small-flowered).* *fl.* white, rosy-tinted, almost globular. Spring. *l.* round-ovate, cuspidate; petioles and principal nerves covered with short reddish pubescence beneath. A hardy deciduous shrub. Japan. (Gn. Dec. 8, 1883.)

M. purpurea (purple). A synonym of *M. obovata discolor*.

M. stellata (starry).* *fl.* white, 3in. in diameter, sweet-scented; sepals shorter than petals, oblong, hairy outside; petals reflexed, narrow, linear-oblong, obtuse; anthers yellow, shorter than the green pistil. March to May. *l.* deciduous, varying from obovate obtuse to elliptic and shortly acuminate, membranous, 2in. to 5in. long. Japan. A pretty tree, flowering before the leaves fully develop. SYN. *M. Halleana*. (B. M. 6370.)

M. Thompsoniana (Thompson's), of gardens. A synonym of *M. glauca major*.

M. tripetala (three-petaled). A synonym of *M. Umbrella*.

M. Umbrella (umbrella).* Umbrella-tree. *fl.* white, with a slight but not altogether agreeable perfume, 4in. to 6in. in diameter; petals nine to twelve, exterior ones pendent. Spring. *l.* deciduous, 1ft. to 2ft. long, spreading, adult ones smooth, young ones pubescent underneath. *h.* 35ft. North America, 1752. A free growing and somewhat straggling hardy deciduous tree. SYN. *M. tripetala*.

MAGNOLIACEÆ. An order of trees or shrubs, natives of tropical and Eastern Asia, North America, rare in tropical and extra-tropical South America; none

Magnoliaceæ—*continued.*

have yet been found in Africa, and very few in Australia and New Zealand. Flowers axillary or terminal, solitary or rarely sub-fasciculate, often showy, hermaphrodite, or, in a few genera, unisexual. Fruit of numerous dry or succulent, dehiscent or indehiscent, carpels. Leaves alternate, undivided, reticulately penni-nerved, entire or dentate. Magnoliaceæ possess bitter, tonic, and aromatic qualities. There are about nine genera and seventy species. Examples: *Drimys*, *Illicium*, *Liriodendron*, and *Magnolia*.

MAGPIE MOTH. *See* **Gooseberry or Magpie Moth.**

MAHALEB. *See* **Cerasus Mahaleb.**

MAHARANGA. Now included under **Onosma** (which *see*).

MAHERNIA (an anagram of *Hermannia*, to which it is closely allied). ORD. *Sterculiaceæ*. A genus comprising thirty-three species of very pretty greenhouse evergreen herbs or sub-shrubs, all natives of extra-tropical and Southern Africa, distinguished from the allied genus *Hermannia* in the filaments of the stamens being dilated in the middle. The species, only a few of which are in cultivation, are of easy culture in a light compost of equal parts loam, peat, and leaf mould, to which may be added a little sand. The plants soon acquire a straggling habit, unless the young shoots are frequently stopped in order to produce a lateral growth. Propagated freely, during summer, by cuttings of young shoots, 1in. to 2in. long, inserted in sandy soil, under a glass.

FIG. 503. FLOWERING BRANCH OF MAHERNIA GLABRATA.

M. glabrata (smooth). *fl.* yellow, drooping, rather large, with a Jonquil-like fragrance; peduncles two-flowered, very long. April to June. *l.* lanceolate, distantly pinnatifidly toothed, roughish from dots and stellated down; stipules ovate, mucronate. *h.* 1ft. to 2ft. Cape of Good Hope, 1789. Sub-shrub. See Fig. 503. (A. B. R. 85.)

M. incisa (cut-leaved).* *fl.* deep crimson in the bud, inclining to a deep orange as they open, and finally becoming yellowish; peduncles usually two-flowered. July and August. *l.* inciso-pinnatifid, covered with glandular, stellate, and simple down. *h.* 2ft. to 4ft. Cape of Good Hope, 1792. Shrub. (B. M. 353.)

MAHOGANY-TREE. *See* **Swietenia Mahagoni.**

MAHONIA. Included under **Berberis** (which *see*).

MAHUREA (its native name). SYN. *Bonnetia*. ORD. *Ternstræmiaceæ*. A small genus (four species) of South American stove evergreen trees. Flowers pink, disposed in narrow terminal panicles; sepals five, imbricated; petals five, contorted. Leaves alternate, often petiolate. Only one species has yet been introduced.

Mahurea—*continued.*

It thrives in a compost of sandy peat and fibry loam. Propagated, during summer, by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in gentle bottom heat.

M. palustris (marsh-loving). *fl.* purplish, terminal, racemose, hardly 1in. in diameter. May. *l.* oblong, coriaceous, entire, full of pellucid dots. *h.* 15ft. 1820.

MAIANTHEMUM (from *maios*, May, and *anthemon*, a blossom; in allusion to the flowering period of the plant). SYNS. *Bifolium*, *Maia*, *Sciophylla*, and *Styrandra*. ORD. *Liliaceæ*. A monotypic genus, the species being a hardy erect, glabrous or puberulous, bulbous plant, with a slender, creeping rootstock. For culture, *see* **Smilacina**.

M. bifolium (two-leaved). *fl.* white; perianth scarcely one line long; raceme somewhat dense, twelve to thirty-flowered; pedicels solitary or twin, very slender, articulated at apex. May. *l.* two, placed above the middle of the stem, petiolate, cordate-ovate, membranous, persistent, 2in. to 3in. long, acute, costate, thickly veined. *h.* 4in. to 8in. North temperate regions (Britain). SYNS. *Convallaria bifolia* (B. M. 510; F. D. 291), *Smilacina bifolia*, and *S. canadensis*.

MAIDENHAIR. The common name for **Adiantum Capillus-Veneris** (which *see*).

MAIDENHAIR-TREE. *See* **Ginkgo.**

MAIDEN PINK. *See* **Dianthus deltoides.**

MAIDEN PLUM. *See* **Comocladia.**

MAIDEN TREE. A term applied to an untrained fruit tree the first year after being worked.

MAIRIA (so called after Professor le Maire, of Ghent, who collected this plant at the Cape). ORD. *Compositæ*. A genus containing ten species of half-hardy or greenhouse herbs or sub-shrubs, all natives of South Africa. Flower-heads intermediate or rather large; ray-florets purplish, rose, or pink; disk-florets yellow; involucre campanulate or hemispherical; receptacle flat, naked. Leaves radical or alternate. The species succeed in a compost of turfy loam and peat, and require an abundance of moisture at nearly all times. Propagated, in spring, by divisions; or by seeds, sown in a cold frame. Probably the only species yet introduced is the one here described.

M. crenata (scolloped). *fl.-heads* solitary, 1in. to 1½in. in diameter, with a bright purple ray and a yellow disk; scape rising from 1in. to 6in. from the centre of the rosette. April. *l.* in a dense rosette, deep green, fleshy, oblong-ovate in outline, tapering at the base into a petiole; margins distantly toothed. Plant stemless. 1820. Greenhouse or half-hardy. (B. R. 855, under name of *Gerberia crenata*.)

MAIZE. *See* **Zea Mays.**

MAJORANA. Included under **Origanum** (which *see*).

MALABAILA (named after Count Malabaila von Canal, a former Director of the Botanic Gardens at Prague). SYN. *Leiotulus*. ORD. *Umbelliferæ*. A genus comprising about half-a-score species of hardy perennial, often glabrous herbs, similar in habit to *Peucedanum*, but with broader leaves. They are natives of South-eastern Europe, Eastern Africa, and Western Asia. Flowers yellowish, in compound, many-rayed umbels; calyx teeth obsolete or minute; petals rather broad, acuminate, inflexed (often obtuse or retuse). Involucral bracts few or none. Fruit orbiculate or rarely obovate, flat, compressed. Leaves pinnate or pinnately decompound; segments often broad, incised-toothed. Seeds of the undermentioned species should be sown in the open ground, in spring.

M. Opoponax (Opoponax). *fl.*, petals roundish, entire, involute; styles very short. June and July. *fr.* girded by a dilated, convex margin. *l.* bipinnate; leaflets unequally cordate, crenated, obtuse, hairy, especially beneath. Sheaths at the flowering branches spathaceous, and sometimes destitute of leaves. *h.* 6ft. South Europe, 1640. SYNS. *Opoponax Chironium*, *Pastinaca Opoponax* (under which name it is figured in S. F. G. 288).

M. pimpinellæfolia (Pimpinella-leaved). *fl.*, petals slightly hairy outside. Involucre of one to three leaves; involucels of four or five leaves, dimidiate, deciduous. July and August. *fr.* orbicular. *l.* bipinnatifid, pubescent; segments cuneated, deeply serrated, lower ones reflexed, upper ones linear-lanceolate. Stem angular, branched. *h.* 2ft. Caucasus, &c., 1818.

MALABAR LEAF. A common name of *Cinnamomum Malabathrum*.

MALACHADENIA. Included under *Bulbophyllum*.

MALACHODENDRON. Included under **Stuartia** (which *see*).

MALACHRA (name used by Pliny to denote a Persian tree). ORD. *Malvaceæ*. A genus comprising five or six species of stove hispid herbs, all indigenous to the warmer parts of America, one or two being also broadly dispersed over the warmer parts of Asia and Africa. Flowers yellow, white, or rose, in dense, axillary or terminal heads, with leafy involucral bracts; calyx five-toothed or cut; column shorter than the stamens. Leaves angular or lobed. The species are of no great horticultural value. *M. fasciata* requires to be raised from seed, in a hothouse, and, when large enough, to be placed singly into small pots.

M. fasciata (fasciate). *fl.* rose; heads shortly pedunculate, three-leaved, about five-flowered. August and September. *l.* almost round, obsoletely lobed. Stems villous. *h.* 1ft. Caracas, 1819. (B. R. 467.)

MALACOCARPUS (from *malakos*, soft, and *karpos*, a fruit; alluding to the juicy fruits). ORD. *Cacteæ*. This genus, now included, by Bentham and Hooker, under **Echinocactus**, is composed of the smooth-fruited species of that genus (which *see* for culture).

FIG. 504. MALACOCARPUS ERINACEUS.

M. erinaceus (prickly). *fl.* straw-coloured, when in bud clothed with long silky brown hairs. Summer. Plant nearly bullet-shaped, very slightly depressed at top, with eighteen more or less spirally-curved ribs. Spines on young individuals, yellow; on older ones horn-like, brownish; eight or ten (seldom more) outer ones, and a single central erect one. Brazil. See Fig. 504, for which we are indebted to Herr Fr. Ad. Haage, jun., of Erfurt, Germany.

MALACOID. Having a mucilaginous texture.

MALAXIS (from *malaxis*, tenderness; in allusion to the nature of the species). ORD. *Orchideæ*. A monotypic genus. The species is a curious and interesting native orchid, rarely seen in cultivation. It grows naturally in spongy bogs, and would probably thrive if naturalised in similar situations. Propagated by divisions of the roots.

M. paludosa (marsh-loving). *fl.* greenish-yellow, small; lip cordate at the base, embracing the column; sepals ovate or broadly lanceolate; raceme long, slender, terminal. July. *l.* from two to four, ovate, rough at the extremity. *h.* 3in. to 4in. Europe (Britain). (G. C. n. s., xxi. 144; Sy. En. B. 1489.)

MALAY OR ROSE APPLE. A name applied to the fruit of *Eugenia Jambos* and to some other species of *Eugenia*.

MALCOLMIA (named after William Malcolm, a London nurseryman, who published a Catalogue of Greenhouse Plants in 1771). ORD. *Cruciferæ*. A genus consisting of about twenty species of hardy, mostly annual herbs, many of which are very variable in habit, &c. They are found in the Mediterranean and Caspian regions, Persia, North Africa, and North-west India. Flowers white or purple. Leaves alternate, entire or pinnatifid. *M. maritima*, the well-known Virginian Stock, is of extremely easy culture in almost any soil or situation. Seeds should be sown, thinly, from early spring until the latter part of autumn. The other species require similar culture.

M. chia (Chian). *fl.* purplish-lilac, about half the size of those of *M. maritima*; racemes three to nine-flowered. June. *l.* pubescent beneath, entire or rarely toothed; lower ones obovate or spathulate; stem ones narrower and more acute. Stems much-branched, 6in. to 12in. high. Chio, 1732. (S. B. F. G. 40.)

M. littorea (seashore). *fl.* bright pink-purple, large, delicate; limb of petals not veined as in *M. maritima*. June to November. Pods hoary. *l.* lanceolate-linear, almost entire, hoary with short down. *h.* 6in. to 12in. Mediterranean region, &c., 1683. (B. M. 4672; S. B. F. G. i. 54.)

M. maritima (sea).* Virginian Stock. *fl.* lilac, rose, red, or white; pedicels bractless, disposed in racemes. Spring to autumn. *l.* elliptical, blunt, entire, narrowed at the base. Stems erect, branched. *h.* 6in. to 12in. Europe, &c., 1713. A very pretty annual, of which there are several varieties.

MALE FERN. *See* **Nephrodium Filix-mas.**

MALESHERBIEÆ. A tribe of *Passifloreæ*.

MALLOCOCCA. A synonym of **Grewia** (which *see*).

MALLOW. The common name for the species of **Malva** (which *see*).

MALLOW-WORTS. A name given by Lindley to the *Malvaceæ*.

FIG. 505. FLOWERING BRANCH OF MALOPE TRIFIDA GRANDIFLORA.

MALOPE (an old Greek name for a kind of Mallow mentioned by Pliny). ORD. *Malvaceæ*. A genus comprising only three species of very ornamental hardy annual glabrous or pilose herbs, confined to the Mediterranean region. Flowers violet or pink, pedunculate, showy. Leaves entire or trifid. These showy plants are of easy culture, in almost any ordinary garden soil, but they succeed best in a sandy one, and in a sunny situation. Propagated by seeds, sown either under glass, in March, or, in the open border, during the latter part of April or early in May.

M. grandiflora (large-flowered). A variety of *M. trifida*.

M. malacoides (Mallow-like). *fl.* rosy-pink, tinged with purple, large, axillary, solitary, pedunculate. June. *l.* petiolate, oblong-ovate, crenate or pinnatifid, cuneate or cordate at the base. *h.* 1ft. South Europe, &c., 1710.

Malope—*continued.*

M. trifida (three-cleft).* *fl.* purple or white, large; peduncles axillary, one-flowered. July to September. *l.* trifid, toothed, glabrous; lobes acuminated. *h.* 1ft. Southern Spain, 1808. The plant known in gardens as *M. grandiflora* is a variety of this species. See Fig. 505.

MALORTIEA (named in honour of E. von Malortie, of Hanover). ORD. *Palmeæ*. A small genus (five species have been described) of elegant dwarf-growing stove palms, natives of Central America. Flowers unisexual, in simply-branched spikes, springing from the axils of the lowermost leaves. Fruit small, roundish or egg-shaped. Leaves on long stalks, irregularly pinnate. Trunks slender. *M. gracilis* and *M. simplex* are admirable subjects for growing in a Wardian case. The species thrive best in a compost of peat and sand, to which a small quantity of sandy loam has been added. An abundance of water and perfect drainage are essential.

M. gracilis (slender). *l.* dark green, on very slender petioles, divided into segments which are toothed at the margins, and the lobes split in the centre. Stems slender, from 2ft. to 4ft. high. Guatemala, 1862. SYN. *Geonoma fenestrata*. (B. M. 5291.)

M. intermedia (intermediate). *l.* dark green, divided into two segments, or four—two unequal pairs; leafstalks slender, nearly as long as leaves. Stem slender, base of leaves forming a strong sheathing network of fine fibres. *h.* 2ft. Costa Rica.

M. simplex (simple). *l.* dark green, oblong, simple or bifid. Costa Rica, 1861. An elegant dwarf and slender-growing plant, somewhat resembling *M. gracilis*, but without the peculiar window-like holes in its leaves. (B. M. 5247.)

MALPIGHIA (named after Marcello Malpighi, 1628-1694, an Italian naturalist and Professor at Bologna). ORD. *Malpighiaceæ*. A genus containing about twenty species of stove evergreen small trees or shrubs, natives, principally, of tropical America. Flowers pink or white, axillary and terminal, fasciculate or corymbose, rarely solitary. Drupe fleshy. Leaves opposite, shortly petiolate, glabrous or tomentose, sometimes covered with stinging hairs, entire or spinose-toothed. The species thrive best in a compost of sandy peat and fibry loam. Propagated, during summer, by cuttings of nearly ripened young shoots, inserted with the leaves intact, under a bell glass, in bottom heat. All the species here described are South American.

M. angustifolia (narrow-leaved). *fl.* pale purple or pink; peduncles axillary, umbellate. July and August. *fr.* small, oval,

FIG. 506. FLOWERING BRANCHLET OF MALPIGHIA AQUIFOLIA.

Malpighia—*continued.*

furrowed, of a dark purple colour when ripe. *l* linear-lanceolate, acute, beset on both surfaces with decumbent stinging bristles. Branches smooth. *h.* 7ft. 1737. Shrub. (L. B. C. 321.)

M. aquifolia (Holly-leaved). *fl.* pale blush or pink; peduncles axillary, solitary or twin, two-flowered. August. *l.* lanceolate, with spiny teeth, beset with decumbent stinging bristles beneath. Branches smooth. *h.* 7ft. 1759. Shrub. See Fig. 506.

M. coccifera (berry-bearing). *fl.* pale blush or pink; peduncles axillary, solitary, furnished with two small scales at their middle. June to August. *l.* obovate or roundish, with spiny teeth, smooth, shining. *h.* 2ft. 1733. A small bushy shrub, thickly beset with Box-like leaves.

M. glabra (glabrous). Barbados Cherry. *fl.* rose-coloured or bright purple; peduncles axillary, umbellate. March to September. *fr.* red, round and smooth, about the size and shape of a cherry, having one or more furrows on the outside, and containing a reddish pulp. *l.* ovate, quite entire, smooth, shining. *h.* 16ft. 1757. This tree is cultivated in all the West Indian Islands, and in many parts of the mainland of South America, for its fruits, which are esteemed there, but are much inferior to our cherries. (B. M. 813.)

M. nitida (shining). *fl.* pink; peduncles umbellately racemose, axillary and terminal. March to July. *l.* lanceolate, acute, quite entire, smooth, shining. *h.* 10ft. 1733. A beautiful shrub.

M. punicifolia (Pomegranate-leaved). *fl.* rose, on axillary, one-flowered peduncles. July. *fr.* about the size and shape of a cherry, very succulent, and of a pleasant, rather acid, taste. *l.* ovate, quite entire, smooth. *h.* 8ft. 1690. A shrub having the appearance of the Pomegranate.

M. urens (stinging). Cowhage, or Cow Itch Cherry. *fl.* pink or pale purple; peduncles one-flowered, aggregate, one-half shorter than the leaves; petals equal. June to October. *fr.* edible. *l.* oblong-ovate, clothed with decumbent bristles beneath, smooth above. Branches smooth. *h.* 3ft. to 6ft. 1737. Shrub.

MALPIGHIACEÆ. An order of often climbing trees or shrubs, principally inhabiting Brazil and Guiana. Flowers yellow or red, rarely white or blue; inflorescence indefinite, often terminal, racemose, corymbose or umbellate, or paniculate. Leaves generally opposite (petiole jointed to the stem), entire, flat (rarely alternate or whorled, sessile, sinuate-toothed or lobed, margins recurved); petiole or under surface or margin of the leaf often glandular; stipules usually geminate at the base of the petiole, rarely united into a sheath. There are about forty-nine genera and 600 species. Examples: *Banisteria, Bunchosia, Galphimia, Gaudichaudia,* and *Malpighia.*

MALUS. Included under **Pyrus** (which *see*).

MALVA (the old Latin name for a Mallow, used by Pliny and Virgil, altered from the Greek *Malachi*, a Mallow, which is probably derived from *malacho*, to soften; referring to its emollient qualities). Mallow. ORD. *Malvaceæ.* This genus comprises about sixteen species of mostly hardy, annual, biennial, or perennial, hirsute or glabrous herbs, indigenous to South Europe, temperate Asia, and Northern Africa. Flowers axillary, solitary or fasciculate, sessile or pedunculate, or rarely in terminal racemes; petals purplish-rose or white, never yellow, emarginate, very rarely denticulate. Leaves often angulate, lobed or dissected. Few of the species are worth growing, the plants being generally of a coarse and weedy growth. The exceptions are of easy culture in any moderately good garden soil. The perennial species may be increased by seeds, or by cuttings; and the annuals by seeds only.

M. Alcea (Alcea). *fl.* pale rosy-purple, about 2in. across, in terminal and axillary clusters. Summer. *l.* palmate, with incised divisions, light green, downy. *h.* 4ft. Europe, &c., 1797. Perennial. (B. M. 2197.)

M. A. fastigiata (fastigiate).* *fl.* red. July to October. *l.*, lower ones five-lobed, upper ones palmately five-cleft, with the lobes toothed. *h.* 2ft. to 3ft. Italy, 1820. Perennial. SYN. *M. Morenii* (B. M. 2793).

M. Creeana (Cree's). A synonym of *Malvastrum coccineum grossulariæfolium.*

M. crispa (curled). *fl.* white, pale purple at the tip, axillary, sessile or nearly so. June. *l.* angular, toothed, curled, glabrous. Stem erect. *h.* 2ft. to 6ft. 1573. Annual. Perhaps a native of China; it occurs in many countries in a naturalised state.

M. involucrata (involucrate). A synonym of *Callirhoe involucrata.*

Malva—*continued.*

M. lateritia (brick-coloured). A synonym of *Malvastrum lateritium.*

M. mauritiana (Mediterranean). *fl.* deep purple; pedicels axillary, numerous, one-flowered. June. *l.* five-lobed, obtuse. Stem erect. *h.* 4ft. to 6ft. South Europe, 1768. Annual. (S. F. G. 81.)

M. Morenii (Moreni's). A synonym of *M. Alcea fastigiata.*

M. moschata (musk).* Musk Mallow. *fl.* rose, about 2in. across, disposed in terminal and axillary clusters. Summer. *l.*, lower ones kidney-shaped, cut; upper ones with five deeply pinnatifid, jagged segments. *h.* 2ft. to 2½ft. Europe (Britain). A handsome perennial, of which there is a form with pure white flowers. (B. M. 2298.)

M. Munroana (Munro's). A synonym of *Malvastrum Munroanum.*

MALVACEÆ. An order of herbs, shrubs, or trees, with light and soft wood, dispersed through all the regions of the earth except the Arctic. Flowers variously coloured, commonly violet, purplish, pink, or yellow, often showy; peduncles axillary and one-flowered, or disposed in racemes, fascicles, or panicles; calyx with an involucel of whorled bracts; petals five, hypogynous. Leaves alternate, simple, usually palminerved, entire or palmilobed; hairs usually stellate. An emollient mucilage abounds in most of the species; some contain free acids, and are employed as refreshing drinks. There are about fifty-nine genera and 700 species. Well-known genera are: *Abutilon, Althæa, Bombax, Gossypium, Hibiscus, Lagunaria,* and *Malva.*

MALVASTRUM (name altered from *Malva*). ORD. *Malvaceæ.* This genus contains about sixty species of greenhouse or hardy herbs, natives, chiefly, of America. Flowers scarlet, golden, or yellow, shortly pedunculate or sub-sessile, disposed in axillary or terminal spikes. Leaves variable, entire, heart-shaped, or partite. In all probability, the species here described are the only ones now in cultivation. For culture, *see* **Malva.**

M. campanulatum (bell-shaped). *fl.* light purplish-rose, about ¾in. in diameter, disposed in a long, loose, terminal spike. Late summer. *l.* large, deeply lobed; lobes twice sub-divided. Stem and leaves covered with short thin down. *h.* 1ft. to 1½ft. Chili, 1839. Greenhouse perennial.

M. coccineum (scarlet). *fl.* scarlet. July to September. *l.* very cæsious. Stem very short. *h.* 6in. Missouri, 1811. Hardy. SYN. *Cristaria coccinea* (under which name it is figured in B. M. 1673).

M. c. grossulariæfolium (Gooseberry-leaved). *fl.* red. July to October. *l.*, upper ones trilobate, central lobe elongated; lower less deeply lobed; petiole somewhat flattened above, hairy, like stem. Branches clothed with harsh stellate hairs. *h.* 2ft. United States, 1835. (B. M. 3698, under name of *Malva Creeana.*)

M. Gilliesii (Gillies'). *fl.* bright red, 1in. or more in diameter. Summer. *l.* palmatifid. *h.* 6in. Extra-tropical South America. SYN. *Modiola geranioides.*

M. lateritium (brick-coloured). *fl.* brick-red, handsome, on long peduncles. Autumn. *l.* three to five-lobed. *h.* 6in. South America, 1840. A prostrate, hirsute, hardy perennial. SYN. *Malva lateritia.*

M. Munroanum (Munro's). *fl.* reddish-pink, tinged with lightish-brown; pedicels one or two, from the upper leaves, in the axils, each bearing one or more flowers; calyx downy. June. *l.* alternate, distant, cordate, obtuse, three to seven-lobed; lobes again crenate-lobed, downy. Stems weak, requiring support. Columbia, 1828. Hardy. (B. M. 3537 and B. R. 1306, under name of *Malva Munroana.*)

MALVAVISCUS (from *Malva*, Mallow, and *viscus*, glue; referring to the mucilage with which it abounds). SYN. *Achania.* ORD. *Malvaceæ.* A genus comprising about six species of greenhouse evergreen shrubs or small trees, mostly hispid, natives of tropical America and Mexico. Flowers red, often pedunculate; petals erecto-connivent or spreading upwards; calyx five-fid. Leaves entire, toothed, or angularly lobed. The species thrive best in a compost of fibry peat and loam. Propagated by cuttings of side shoots, placed under a bell glass, in heat.

M. arboreus (tree-like). *fl.* scarlet, large; leaves of involuce erect. Summer. *l.* cordate, three to five-lobed, acuminated, roughish. *h.* 12ft. West Indies, 1714. Shrub. (B. M. 2305, under name of *Achania Malvaviscus.*)

Malvaviscus—*continued.*

M. mollis (soft). *fl.* scarlet; leaves of involucel rather spreading. Autumn. *l.* cordate, somewhat three-lobed, soft, tomentose. *h.* 12ft. Mexico, 1780. Shrub. (B. M. 2374, under name of *Achania mollis.*)

MAMESTRA. A genus of thick-bodied moths, belonging to the *Noctuæ*, or Night Moths, and including six species, which vary in breadth of wing from 1½in. to 1¾in. All the moths are dark-coloured, with distinct lines or spots; and the larvæ are dull-coloured, usually some shade of green or brown. The larvæ feed on low plants, and in gardens are very hurtful to salad plants and potherbs. When full fed, they burrow in the ground, and form earthen cocoons, in which they become pupæ in autumn, to emerge as moths in the following spring. Though several species are injurious, the most hurtful in gardens is the Cabbage Moth (*M. Brassicæ*), which eats its way into the hearts of Cabbages, and can hardly be removed in any way short of cutting up the Cabbages. The same larva eats the leaves of Dahlias, Pelargoniums, and other garden flowers. *See also* **Cabbage Caterpillars.**

MAMILLARIA. *See* **Mammillaria.**

MAMMÆFORM. Formed like a nipple.

MAMMEA (from *Mammey*, its vernacular name in South America). ORD. *Guttiferæ.* A genus comprising five species of stove fruiting trees, of which one is tropical American, another tropical African, and the rest natives of tropical Asia and Madagascar. Flowers polygamous; calyx globular, opening in two valvate sepals; petals four to six; peduncles axillary, one-flowered, solitary or fasciculate. Drupe indehiscent, one to four-seeded. Leaves rigid, coriaceous, often having pellucid dots. The species require strong heat to thrive well; and a compost of fibry, sandy loam, with a little dried leaf mould, is most suitable. Propagated by cuttings of half-ripened shoots, taken with the leaves intact, and placed under a bell glass, in bottom heat.

M. africana. *See* **Ochrocarpus africanus.**

M. americana (American). Mammee-tree. *fl.* white, fragrant, 1½in. in diameter; peduncles one-flowered, short, scattered over the stouter branches. July. *fr.* large, round, obsoletely three or four-cornered, about the size of a cannon-ball, covered with a double rind; the outer leathery, one line in thickness, tough, brownish-yellow; the inner thin, yellow, adhering closely to the flesh, which is firm, bright yellow, has a singular, pleasant taste, and a sweet, aromatic smell; but the skin and seeds are very bitter and resinous. *l.* obovate, very blunt, quite entire, 5in. to 8in. long. *h.* 60ft. Tropical America, 1739. A handsome tree, with a thick, elegant, spreading head. Eau de Créole—an aromatic liqueur—is distilled from the flowers of this species.

MAMMEE-TREE. *See* **Mammea americana.**

MAMMILLARIA (from *mamilla*, a little teat, diminutive of *mamma*, the nipple; the plants are covered with mammæform tubercles, spirally disposed, the mammæ bearing radiating spines at the apex, and deciduous tomentum). Haworth, who founded the genus, wrote it *Mamillaria.* Including *Anhalonium.* ORD. *Cacteæ.* A genus comprising about 300 species of greenhouse succulent perennials, natives of Mexico, the warmer parts of North America, Brazil, and rarely occurring in the West Indies and Bolivia. Flowers produced towards the summit of the plants, usually in a transverse zone, solitary, and growing from the axil of one of the tubercles, or teats. Stem cylindrical or globular, seldom exceeding 10in. or 12in. in height, and usually only 3in. to 6in. high, and from 1in. to 3in. in diameter. The tubercles, or mamillæ, range in size from minute elevations scarcely ⅛in. high to 1in. high and as much in diameter, varying in form from cylindrical, spindle-shape, conical, or ovoid, to angular and irregularly pyramidal, spirally arranged around the stem, and spiny at the apex. Concerning this genus, Mr. Lewis Castle remarks, in his "Cactaceous Plants": "It would be very difficult to find any plants in the whole vegetable kingdom which present such beautiful examples of symmetry as the Mammillarias, and in their own family they are unique in this respect; for, though many of the grotesque Opuntias, Cereuses, and Echinocactuses, possess larger and more brilliant flowers, and they are surpassed in horticultural value by the Phyllocactuses and Epiphyllums, yet for delicacy of design they are unrivalled. A large number of them resemble exquisite pieces of mechanism, finished with the greatest minuteness and accuracy; others, again, might be imagined to have undergone a kind of crystallisation, their whole surface being frosted over with star-like spiculæ, arranged with geometrical precision; and still others appear as if covered with the finest gossamer. . . . . Strangely beautiful indeed are most of the Mammillarias, and in contrast with their neat rosettes or stars of spines, are the rosy, yellow, and white flowers, which are generally followed by small, berry-like, coral-coloured fruits, that, dotted amongst the spines, add another phase to the attractions of these plants. With so much to recommend them, it is not surprising that they have become great

FIG. 507. MAMMILLARIA (GRAFT ON CEREUS STOCK).

favourites with cultivators of Cacti, and with that portion of the public who have obtained any knowledge of them."

Cultivation. Mammillarias thrive in a mixture of sandy loam and finely-broken bricks and lime rubbish. Many of them affect limestone districts in a wild state, and to those which do not do so, the lime rubbish in the soil proves beneficial under artificial conditions. Plenty of light—indeed, full exposure to direct sun-light is desirable at all times—and careful watering are all that is needed to insure success. During the period of growth—spring and early summer—more heat is necessary than during the rest of the year. Some of the delicate species thrive admirably when grafted on some *Cereus* stock. See Fig. 507.

A representative list of the more select species is here given; the names quoted in Continental catalogues number four times more than those enumerated below.

M. angularis (angular-stemmed). *fl.* rosy-purple. Stem branched, 4in. to 8in. high, 2in. in diameter; tubercles conical, thick, ½in. long, with a tuft of white down at the top, and four or five white spines of irregular length. Mexico, 1835. A very distinct and robust-growing species.

M. applanata (flattened). *fl.* white, tinged with red. Stem simple, flattened; tubercles four-angled, pyramidal, white, woolly in axils when young. Spines straight; outer ones seventeen to twenty, very thin, white, pale yellow, or ashy-grey; central one upright, short. Mexico.

M. atrata (blackened). *fl.* reddish-pink, copiously produced near the apex of the stem. Stem simple, oval-cylindrical, thick; tubercles dark green, thick, conical, somewhat obtuse; the lower ones compressed, obtuse at apex; areolæ white-villous, setose. Chili (B. M. 3642.)

Mammillaria—*continued.*

M. bicolor (two-coloured).* *fl.* purple, small. Stem cylindrical, somewhat club-shaped, 8in. to 10in. high, 2in. to 3in. in diameter, branching from near the base; tubercles very short, dark green, hidden by the spines, which are in two series, the outer filiform, closely set, spreading, the others fewer, erect, yellowish. Mexico, &c., 1835. A distinct species, the whole surface of which appears as if covered with a fine cobweb.

M. Caput-Medusæ (Medusa's head). *fl.* white, about 1in. in diameter. Stem from 4in. to 6in. high, globular, or occasionally columnar; tubercles four-angled or ovate, bearing four small white spines and two thicker and stronger ones.

M. chlorantha (greenish-yellow-flowered). *fl.* greenish. Stem cylindrical, covered with long, densely interwoven spines. Texas, 1883.

M. cirrhifera (tendril-bearing). *fl.* bright rose; anthers yellow. Stem cylindrical, 3in. to 4in. high; tubercles short, conical, ¼in. long, glaucous-green, furnished with a crown of yellow spines. Mexico, 1835. A pretty little species, having a neat and symmetrical habit.

M. clava (club-shaped).* *fl.* two or three, large, handsome, showy, borne at the summit of the plant; base (calyx) of green scales, tipped with red; petals glossy straw-colour, numerous, serrated and mucronate at apex, the more exterior ones entire, and tinged with dull red; stamens orange, numerous; rays of the stigma yellow. June. Stem columnar, glaucous green, 1ft. high; tubercles pyramidal, large, projecting, and ascending; axils densely downy with white wool; areolæ terminal, and bearing besides eight to eleven long, rigid, pale brown spines, and a single larger and stronger one. Mexico, previous to 1848. (B. M. 4358.)

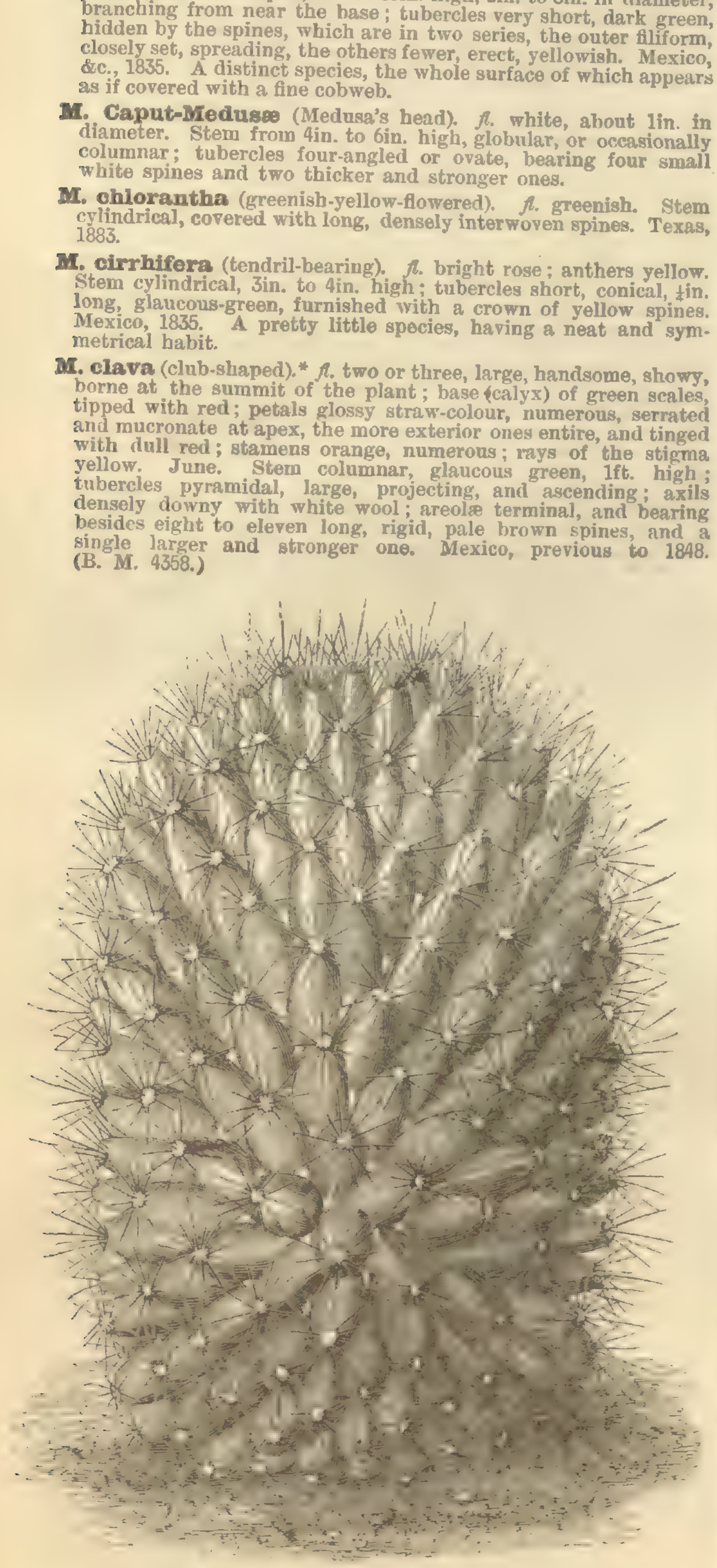

FIG. 508. MAMMILLARIA DOLICHOCENTRA.

M. dolichocentra (long-spurred).* *fl.* pale rose or reddish-crimson. Stem stout, 6in. to 8in. high, 3in. in diameter; tubercles conical, narrow, ½in. long, crowned with a small tuft of white down, and a few white spines of irregular length. Mexico. A strong-growing species, of variable habit. See Fig. 508.

M. floribunda (copious-flowering). *fl.* pink, tinged with red, very copiously produced; petals very unequal. Stem globose-sub-cylindrical; tubercles thick, conico-hemispherical, obtuse; prickles villose-tomentose. Chili. This species approaches *M. atrata*, but differs in its stouter habit, larger tubercles and flowers, and unequal petals. (B. M. 3647.)

Mammillaria—*continued.*

M. gracilis (slender).* *fl.* pale yellow, rather large. Stem cylindrical, 1in. to 2in. high, ¼in. in diameter; tubercles small, green; spines in one series, white, spreading, closely set. Mexico. One of the prettiest of the dwarf-growing species.

FIG. 509. MAMMILLARIA HAAGEANA.

M. Haageana (Haage's). *fl.* bright carmine-rose, scarcely longer than the tubercles. May to July. Stem bullet-shaped when young, somewhat club-shaped when old, only slightly woolly in the axils; spines, outer ones about twenty, short, white; central ones two, stiff, longer, black. Mexico, 1835. See Fig. 509, for which we are indebted to Herr Fr. Ad. Haage, jun., of Erfurt.

M. Lehmanni (Lehmann's). *fl.* moderately large, terminal; petals straw-colour, numerous, linear-oblong, imbricated; filaments red. Stem 6in. high, oblong-cylindrical, covered all over with large conical tubercles, tipped with a minute woolly tuft, from which springs a fascicle of seven or eight slender spines, one of which is twice as long as the rest. Mexico, 1836. (B. M. 3634.)

M. micromeris (small-flowered). *fl.* pale rose, very minute, succeeded by red berries ¼in. long. Stem resembling a flattened ball, 2in. in diameter, and 1½in. high, with a circular tuft of down in the centre at the apex, about 1in. across, surrounded by stiff white spines; tubercles very small, closely set. Mexico, &c.

M. multiceps (many-branched). *fl.* pale yellow, with a reddish line in the centre of the petals. Stem dwarf, much-branched or divided, 1in. high, ½in. in diameter; tubercles ⅛in. to ¼in. long, fine, numerous, the inner yellow, larger, and stronger. Mexico.

M. Neumanniana (Neumann's). *fl.* of a rosy hue. Stem cylindrical, 5in. to 6in. high; tubercles stout, ⅜in. long, dark green, with a tuft of down at the apex, and a few tawny spines, ¼in. long. Mexico, 1845. A bold and distinct species.

M. Odieriana (Odier's). *fl.* reddish-violet. Stem cylindrical, 3in. to 4in. high, 2in. in diameter, very symmetrical; tubercles ⅛in. long, dark green, with the spines in two series, the outer close and fine, the inner tawny, ½in. to ¾in. long. Mexico. A very attractive and neat plant.

M. Parkinsonii (Parkinson's). *fl.* yellow. Stem 4in. to 6in. high, 2in. to 3in. in diameter; tubercles small, each bearing a star of diminutive white hairs, and four or five stiff erect white spines, 1in. to 1½in. long, tipped with brown. Mexico. A very distinct, stout-growing species.

M. Peacockii (Peacock's).* A small semi-globular mass, clothed with woolly hairs and spines, having much the appearance of a ball of grey worsted. Mexico, 1872.

M. pectinata (combed).* *fl.* yellow, about 2in. in diameter, lasting in beauty only about two hours. Stem conical or nearly globular, 3in. high, and 2½in. in diameter; tubercles short and stout, each crowned with a rosette, about ½in. across, of white spines in one series. Limestone hills on the borders of Mexico. One of the handsomest species.

M. phymatothele (tumour-nippled). *fl.* bright rose. Stem 5in. to 6in. high, 2in. in diameter; tubercles ⅓in. long, conical, dark green, crowned with a small tuft of white down, and a few white hair-like spines, which are spreading and erect. Mexico, 1846. A not uncommon and strong-growing species.

M. pulchra (handsome). *fl.* rosy, rather large, produced near the summit of the plant, from the woolly axils of the tubercles. June. Stem green, 4in. to 5in. high, oblong-cylindrical, with a depressed woolly apex, and almost covered with unequal spines, arranged in eleven to thirteen symmetrical, very spiral rows; tubercles rather large, ovately pyramidal. Mexico, 1826. (B. R. 1329.)

M. pusilla (small).* *fl.* yellowish, the petals with a central line of rose. Stem 1in. to 2in. high, cylindrical globular; tubercles narrow, conical, ⅛in. to ¼in. long, grey-green; spines in two series, outer numerous, filiform, white; inner fewer, erect, brownish. West Indies, 1820. A very small, but exceedingly pretty plant. (L. B. C. 79, under name of *Cactus stellatus*.)

Mammillaria—*continued.*

M. p. texana (Texan). This principally differs from the type in the larger number of radial spines (there are from twelve to twenty in *M. pusilla*), and in the dark green colour of the tubercles; the exterior hair-like spines cover the whole plant as if with a coarse wool. Texas.

M. pycnacantha (densely-spined). *fl.* deep sulphur-yellow, five or six on the top of the plant, very handsome; petals linear-oblong; anthers orange. July. Stem 6in. high, of a rounded form, but nearly cylindrical; tubercles large, nearly 1in. broad at base, obscurely two-lobed; axillæ filled with dense white wool; spines twelve to sixteen, woolly at base, spreading and recurved, pale brown. Oaxaca, Mexico. (B. M. 3972.)

M. raphidacantha (needle-spined). *fl.* purplish-violet, about 1in. in diameter. Stem cylindrical, 3in. to 5in. high, 1in. in diameter, slender; tubercles short, conical, ¼in. long, dark green; spines eight or nine, in one series, spreading, star-like, close set, ¼in. long, white. Mexico. A very pretty species, the peculiar spines somewhat resembling crystals of ice.

M. recurva (recurved). *fl.* red, disposed in zones round the summit of the plant. Stem simple, sometimes divided; axils with abundant white wool; tubercles subtetragonous, compressed; spines few, very long, sub-angular, white, or nearly fawn-coloured. Mexico.

M. rhodantha (rose-flowered). *fl.* bright rose. Stem 2in. to 6in. long, 2in. in diameter, branched; tubercles conical, ⅛in. to ¼in. long, with a tuft of down at the apex, and six irregular white or yellowish spines ¼in. to ½in. long. Mexico, 1836. A most desirable, free-flowering species.

FIG. 510. MAMMILLARIA SANGUINEA.

M. sanguinea (bloody).* *fl.* dark red. Stem short, columnar; mamillæ glaucous-green, woolly in the axils, with from twenty-four to twenty-six radiating spines, and seven to nine stronger central ones, about twice as long as the outer spines. Mexico, 1883. See Fig. 510, for which we are indebted to Herr Fr. Ad. Haage, jun., of Erfurt. (R. G. 1111.)

M. Schiedeana (Schiede's). *fl.* white, small. Stem cylindrical, globular, 3in. to 5in. high, 2in. in diameter; tubercles dark green, cylindrical, ¼in. long, very narrow and distinct, with yellow, filiform spines, forming a small star ¼in. in diameter. Mexico, 1845. A very distinct and pretty species, producing flowers in abundance.

M. senilis (old). *fl.* orange-red, with a violet tint. Stem spheroid or cylindrical, bearing numerous long white spines. Mexico, 1874.

M. simplex (simple). *fl.* greenish-white, small. Stem simple, globular, 4in. to 6in. high; tubercles conical, small, crowned with white down and two series of strong reddish spines. Tropical America, 1690. The first species introduced.

M. stella-aurata (golden-star-spined).* *fl.* white, small. Stem 2in. high, ½in. in diameter, branched; tubercles short and green; spines in a flat, spreading, star-like rosette, very numerous, ⅛in. to ¼in. long, yellowish. Mexico. An exceedingly pretty species, being covered with star-like rosettes of yellow spines.

M. tenuis (slender). *fl.* pale straw-colour, slightly tinged with red externally, solitary, small, campanulate, produced from below the summit and from all sides of the plant. May. Stem 2in. to 4in. high, 1in. or more in diameter, cylindrical, or tapering upwards, and, as well as the copious globular side offsets, covered with green hemispherical tubercles; these are about ¼in. in diameter, each tipped with a soft tuft of white down, from which diverges a cluster of about twenty slender aculei, at first reddish, then yellowish or pale tawny. Mexico, 1830. (B. M. 3646; B. R. 1[illegible]3.)

M. tetracantha (four-spined). *fl.* bright full rose-colour, paler in the disk, numerous, small, from the axils of the tubercles, crowded about the depressed portion of the plant. July. Stem sub-globose, flattened at top, nearly 9in. high, and a little less in diameter; tubercles conical or pyramidal, terminated with a depression, from which arise four spreading prickles; the latter are about ⅔in. long, at first brown, tipped with a darker colour, then paler, becoming at length nearly white; axillæ between the tubercles occupied by a dense mass of white wool, as are also the apices of the tubercles. Mexico. (B. M. 4060.)

M. turbinata (top-shaped). *fl.* about 1in. in diameter, borne on the upper part of the plant; petals pale yellow or straw colour; anthers and stigmas yellow. June. Stem globose, depressed at the summit, and contracted at base, as large as a moderate-sized apple; tubercles at the contraction of the stem flattened, and lengthened out transversely; the rest are prominent, sub-hemispherical, but obtusely quadrangular and umbilicated at top, whence, in the upper ones, rises a fascicle of from three to five spines; the other tubercles are spineless, the spines being deciduous. Mexico, 1838. (B. M. 3984.)

M. Wildiana (Wilde's).* *fl.* rose. Stem 3in. to 4in. high, cylindrical, closely surrounded by offsets; tubercles conical, dull green; spines in two series, the outer white, closely spreading; the others fewer and large, yellowish, and hooked at the apex. Mexico. A desirable species.

MAMMOTH-TREE. *See* **Sequoia gigantea.**

MANCHINEEL-TREE. *See* **Hippomane Mancinella.**

MANCINELLA. A synonym of **Hippomane** (which *see*).

MANDARIN ORANGE. *See* **Citrus nobilis.**

MANDEVILLA (named after H. J. Mandeville, a British Minister at Buenos Ayres). SYN. *Amblyanthera.* ORD. *Apocynaceæ.* A genus comprising about forty-five species of tall climbing shrubs, natives, for the most part, of tropical America. Flowers yellow, white, or rarely violet, often large, in simple racemes; calyx five-parted; corolla funnel-shaped; tube cylindrical or ovoid; throat campanulate or oblong, without scales. Leaves opposite, feather-veined. *M. suaveolens*, the only species yet introduced, is a very handsome, half-hardy, deciduous climber, thriving in a compost of good peat and turfy loam, in equal parts, to which may be added plenty of silver sand. It forms an excellent subject for planting in a conservatory and training up a rafter, or may be successfully cultivated, in some parts of England, in the open air, if provided with protection in winter. Propagated by cuttings, made of small, stiff, side shoots, about 3in. long, and inserted in sand, under a bell glass. This plant rarely succeeds when grown in pots.

M. suaveolens (sweet-scented). *fl.* pure white, large, very fragrant, sometimei borne in great profusion. Summer. *l.* opposite, cordate oblong, dark green. Buenos Ayres, 1837. (B. M. 3797; B. R. xxvi. 7.)

MANDIOCCA. A synonym of **Manihot** (which *see*).

FIG. 511. MANDRAGORA VERNALIS showing (*a*) Entire Plant in Flower; (*b*) Young Fruit; (*c*) Ovary, &c.; (*d*) Stamen.

MANDRAGORA (the old Greek name used by Hippocrates). Mandrake. ORD. *Solanaceæ*. A genus comprising three or four species of hardy perennial, almost stemless, herbs, with large thick roots, inhabiting the Mediterranean region. Flowers pale bluish-violet, whitish or purplish, large, reticulately veined; corolla campanulate, somewhat five-fid; lobes rather broad, flat, imbricated. Berry globose. Primordial leaves of the stem abbreviated, sub-radical, petiolate, large, undulated or sinuate-toothed; older ones often narrower and entire. The species are chiefly of botanical interest, and scarcely merit a place in the garden. They thrive in a deep, light soil, and in a shady situation. Propagated by seeds, or by divisions of the root.

M. autumnalis (autumnal). *fl.* violet-coloured, on pale purple scapes; corolla spreading. September. *l.* oblong, pilose, wrinkled, undulated, bristly on the upper surface. *h.* 6in. to 12in. South Europe, 1548. Supposed to be the Mandrake mentioned in the 30th chapter of Genesis. (S. B. F. G. ser. ii. 325.)

M. officinalis (officinal). A synonym of *M. vernalis*.

M. vernalis (spring).* Devil's Apples. *fl.* white or bluish. May. *l.* oblong-lanceolate and ovate, acute, 1ft. long, undulated. *h.* 1ft. South Europe, 1548. See Fig. 511.

MANDRAKE. *See* **Mandragora.**

MANETTIA (named after Xavier Manetti, Prefect of the Botanic Gardens at Florence in the middle of the eighteenth century). SYNS. *Bellardia, Conotrichia, Guagnebina, Lygistum,* and *Nacibea*. ORD. *Rubiaceæ*. A genus of thirty species of very ornamental, stove, evergreen, herbaceous or suffruticose climbers, natives of tropical America and sub-tropical Australia, allied to *Bouvardia*. Flowers white, blue, or red, on axillary peduncles; corolla funnel-shaped, with a terete tube and a hairy throat; peduncles one or many-flowered. Leaves ovate-oblong, or sub-cordate; stipules broad, short, acute. The species are of easy culture in a compost of peat, loam, and sand, in equal parts. Many are exceedingly useful for growing on a trellis, a rafter, or pillar, pruning occasionally where very strong growth is made. Propagation is effected by cuttings, made of the young shoots, and inserted in a sandy soil, in bottom heat.

M. bicolor (two-coloured). *fl.* bright scarlet at the lower portion, yellow towards the apical part of the tube, solitary and axillary. March. *l.* lanceolate, tapering to a point, bright green, opposite. Organ Mountains, 1843. (F. d. S. 61.)

M. coccinea (scarlet). *fl.* having a white tube spotted with red, a throat closed by yellow hairs, and four oval-acute lobes, which are scarlet and villous above; peduncles axillary, racemose, few-flowered. May and June. *l.* ovate, acuminated, glabrous, shining. Branches tetragonal. French Guiana, 1806. (B. R. 693.)

M. cordifolia (cordate-leaved). *fl.* scarlet, 1in. long, villous inside; peduncles axillary, one-flowered. August to October. *l.* ovate, cordate at the base, acute at the apex, pubescent. Brazil, 1832. A very useful species, flowering from winter until early summer. (B. M. 3202.)

M. micans (glittering). *fl.* rich orange, with yellowish lobes; panicles leafy, many-flowered. Early winter. *l.* ovate-lanceolate, cordate at the base, bright shining green, on very short petioles. Magna, Peru, 1865. A very handsome, strong-growing species, and one of the best in cultivation. (B. M. 5495.)

MANGEL WURZEL (*Beta vulgaris macrorhiza*). A cultivated race of *Beta vulgaris*, largely grown as fodder for cattle.

MANGIFERA (from *Mango*, the Hindoo name of the fruit, and *fero*, to bear). ORD. *Anacardiaceæ*. A genus containing less than fourteen species of stove evergreen trees, natives of tropical Asia. Flowers pedicellate, in branched terminal panicles; calyx four or five-partite; petals four or five, spreading, imbricated. Fruit sub-reniform or ovoid, fleshy. Leaves alternate, petiolate, simple, entire, coriaceous. The Mango-tree, *M. indica*, is sometimes seen in this country, and its fruit has been occasionally grown to perfection. It thrives best in a compost of peat and rich loam. Propagated by cuttings of nearly ripened shoots, inserted in sand, under a glass, and in bottom heat.

M. indica (Indian). Mango-tree. *fl.* whitish, streaked with yellow, disposed in loose terminal bunches or panicles. July. *fr.* somewhat kidney-shaped, yellowish and reddish, or speckled with black when fully ripe, and replete with a fine agreeable juice. *l.* oblong-lanceolate, stalked, 7in. to 8in. long, and 2in. or more broad. *h.* 60ft. East Indies, 1690. (B. M. 4510.)

MANGLESIA. Included under **Grevillea** (which *see*).

MANGLILLA. A synonym of **Myrsine** (which *see*).

MANGOSTANA. A synonym of **Garcinia** (which *see*).

MANGOSTEEN. *See* **Garcinia Mangostana.**

MANGO-TREE. *See* **Mangifera indica.**

MANGROVE. *See* **Rhizophora.**

MANICARIA (from *manica*, a glove; referring to the spathe which surrounds the flower stem). SYN. *Pilophora*. ORD. *Palmeæ*. This genus comprises two or three species of robust, unarmed, stove palms, natives of tropical America, from Northern Brazil to New Grenada. Flowers yellowish-pink, rather large, sweetly scented; spadix interfoliaceous. Leaves terminal, large, rigid, sub-erect, lanceolate, acute, plicate-nerved, serrate, at length pinnatisect. *M. saccifera*, probably the only species yet introduced, inhabits the tidal swamps of the Lower Amazon River, and is distinguished from nearly all other palms in the leaves being entire, or occasionally irregularly split when old. A rich sandy loam is necessary for its culture. Propagated by seeds, which should be sown in a strong, moist heat.

M. saccifera (bag-bearing). *fl.* of separate sexes borne upon the same spike; spikes simply branched, from 3ft. to 4ft. long, hanging down among the leaves, and inclosed in an entire brown spathe of a tough fibrous texture, which is at length split open. *fr.* three-lobed, covered with blunt angular tubercles of a dry, corky nature. *l.* simple, sometimes 30ft. long, and 4ft. to 5ft. wide, with coarsely serrated edges, and transverse furrows, stiff, erect upon the summit of the stem. Trunk erect, deeply ringed, from 15ft. to 20ft. in height. South America, 1823.

MANIHOT (the Brazilian name of the genus). SYNS. *Janipha, Mandiocca*. ORD. *Euphorbiaceæ*. A genus comprising about eighty species of mostly greenhouse tall herbs or evergreen shrubs, all natives of America, and, for the most part, Brazilian; a few being dispersed through the warm regions as far as Mexico. Flowers usually rather large, racemose, monœcious, apetalous; racemes terminal, or in the axils of the upper leaves, simple, or slightly branched. Leaves alternate, petiolate, undivided, or often digitately three to seven-lobed or parted; segments petiolate or variously confluent, membranaceous or coriaceous, feather-veined, entire or sinuately lobed. Some of the species of this genus are of great economic value. From *M. Aipi* and *M. utilissima*, Cassava, or Mandiocca meal, is obtained. The root of the former plant is sweet and wholesome, and is utilised as a vegetable in its native country; but that of *M. utilissima* is virulently poisonous and bitter. The poisonous juice is, however, expressed in the process of manufacture, and, when allowed to settle, deposits what is known as Brazilian Arrowroot, or Tapioca. From this the Tapioca of our shops is prepared. The species are of little horticultural value. They thrive best in a compost of peat, loam, and sand, to which may be added a small quantity of charcoal. Propagated by cuttings of young, rather firm shoots, inserted in sandy peat, under a bell glass, in bottom heat.

M. Aipi (Aipi). Sweet Cassava. This differs from *M. utilissima* in having wholesome, sweet, reddish roots.

M. utilissima (most useful). *fl.* yellowish; calyx five-lobed or parted. July. *l.* seven to five (or three) parted, glaucous beneath, segments oblong-lanceolate or lanceolate, acuminate, quite entire. Stems rising from long, thick, fleshy, cylindrical roots, erect, knotty, somewhat twisted. *h.* 3ft. South America, 1739. (B. M. 3071, under name of *Janipha Manihot*.)

MANNA ASH. *See* **Fraxinus Ornus.**

MANNA-TREE. *See* **Alhagi.**

MAN ORCHIS. This is a name usually assigned in books to *Aceras anthropophora*, which is also called Green Man, or Green Man Orchis.

MANTISIA (from *mantis*, an insect, to which the flowers have been compared). ORD. *Scitamineæ*. A small genus (two species) of stove herbaceous perennials, natives of the East Indies. Flowers pale violet, with a yellow lip; thyrse loose; scape leafless. Leaves usually narrow, with a long twisted point. *M. saltatoria* is the species usually seen in our stoves. It thrives in a compost of sandy peat and fibry loam; thorough drainage is most essential. Propagated by divisions, made just as growth commences.

M. saltatoria (dancing).* Dancing, or Opera Girls. *fl.*, petal yellow, large, the rest of the flower purple; laciniæ dissimilar, the upper one rounded in a kind of blunt spur, two lower somewhat ear-shaped; bracts large, petal-like. July. *l.* broad-lanceolate, much elongated at the point, with petioles entirely sheathing the stem. *h.* 1ft. East Indies, 1808. (B. M. 1320.)

MANULEA (from *manus*, the hand; in allusion to the divisions of the corolla). SYN. *Nemia*. ORD. *Scrophularineæ*. A genus comprising about twenty-five species of glabrous or pubescent greenhouse herbs, or rarely sub-shrubs, confined to South Africa. Flowers racemose; racemes sometimes simple and naked, or minutely bracteate, sometimes compound, composed of many-flowered peduncles; corolla-tube elongated, somewhat erect at top. Leaves often at the base of the stem, approximate or rosulate; stem ones few, opposite, or upper alternate; floral ones small, often bract-like. For culture, *see* **Celsia.**

M. rubra (red).* *fl.* golden-yellow, ½in. long; raceme interrupted, a little branched. April to September. *l.* oblong-lanceolate, dentate, narrowed at the base, downy. Stem erect, decumbent at the base, villous. *h.* 1ft. to 2ft. 1790. Perennial.

M. tomentosa (tomentose). *fl.* orange; raceme many-flowered, 2in. to 3in. long. May to November. *l.* obovate or oblong, toothed, thick, densely tomentose. Stem decumbent, dwarf, branched, villous. *h.* 1ft. 1744. Perennial. (B. M. 322.)

MANURES. The use of Manures is to supply nutritive matter for encouraging and sustaining plant growth; any substance, therefore, added to the soil which has the power, either directly or indirectly, of increasing its fertility, may be considered as a Manure. It may contribute directly, by supplying what is requisite, or indirectly, by its action on other substances that might be already present, but not in a suitable state for being absorbed. Growth in plants cannot take place without the main constituent parts of which they are composed being extracted from the earth; and as the production of crops annually necessitates the withdrawal of an enormous supply of certain elements from the soil, it is evident that, were they not restored by some means, exhaustion would, sooner or later, take place. Manures contain, in a concentrated form, the elements requisite for the sustenance of plants, some being much stronger than others, according to the proportion of powerful constituents, combined either in a natural or an artificial manner, in their preparation. The strength of Manures, and their special adaptability for certain crops, must always be a guide to the gardener in disposing of them to the best advantage. In their application to plants at an improper time, or in an improper way, direct harm, or possibly death, may be caused, while the same application, at a suitable season, might be attended with beneficial results. According to experiments which have been made, "all substances entering into the composition of vegetable Manure, or food, must be in a state of fluidity, or in the form of gas or air. The great object, therefore, in the application of Manure, should be to make it afford as much soluble matter as possible to the roots of the plant, and that in a slow and gradual manner, so that it may be entirely consumed in forming its soft and organised parts." Substances of animal or vegetable origin must, therefore, undergo a process of decomposition before they can become absorbed for the nourishment of plants. This may partly take place before they are applied to the soil, or, in some cases, it may be entirely effected afterwards. It is not intended here to describe the nature of different changes which take place chemically, in consequence of the exposure of various substances to the air, or from their being placed in contact with each other. Changes must and do take place naturally; for practical purposes, it matters not so much how they are caused, as how far they succeed in accomplishing their intended purpose in promoting fertility in the soil to which they are applied. All Manures may be, and usually are, divided into two classes. Those composed of vegetable or animal substances of any description are termed *Organic*; and others, which are of mineral origin, are termed *Inorganic*.

A few of the different kinds most in use are briefly enumerated below. An excellent plan of applying strong Manures is to mix a proportion with, in many cases, several times its bulk of soil or garden refuse, and so form a fertilising compost, which may be applied to almost any garden crop with excellent results. Composts thus prepared become useful in two ways: the powerful properties of the Manure, when intermixed with soil, become partially absorbed by the latter, and are rendered less harmful; and the decomposition of all the vegetable matter is also at the same time hastened.

I. Organic Manures.

Blood. This is extremely powerful as a Manure. It is rich in nitrogen; but the chemical composition varies somewhat, according to the different animals from which it is obtained. Blood is most safely applied to land after being dried, or when mixed with earthy substances to form a compost.

Bones. Both for field and garden crops, as well as for fruit and other trees, grown in pots or in borders, bones are extensively employed as Manure. When used in merely a crushed state, their decomposition is usually slow, consequently, the fertilising properties are lasting. If reduced to a powder, and applied, the results are observable in a much shorter time. Bones may be dissolved by throwing them into a compact heap, moistening, and then covering them with earth. In this condition, they soon ferment and crumble, and when thus reduced they may be applied to the land. Crushed bones may be advantageously used with nearly an equal amount of ashes, or with one-third their weight of gypsum. Bone Manure is specially beneficial to crops of Turnips.

Farmyard Manure. By this term reference is made to Manure collected from various sources on a farm. The excrements of different animals possess special fertilising properties, and may be kept separate for particular purposes. For ordinary uses, Farmyard Manures are best mixed together, as then a larger number of different constituents are included in the whole, and are consequently available as plant food. The liquid, as well as the solid, portions, should be retained for affording moisture, to cause a slight fermentation, and also for its own enriching properties. Violent heating by fermentation should not be allowed, but partial decomposition of such Manure before adding it to the soil will render the parts more soluble, and in a better state for being readily absorbed. The value of good Farmyard Manure to all crops, and the method of applying it to land is so well known, that no further reference is necessary.

Fish. Fish are sometimes used as Manure. Their decomposition is very rapid, and the quantity applied to land must be limited, on account of its strength. Fish are more safely used as Manure if mixed in a compost of soil and refuse, so that the powerful fertilising properties may be evenly distributed throughout.

Manures—*continued.*

Garden Refuse. Such refuse as Cabbage leaves, Turnip tops, and green vegetable matter of almost any description, is valuable as Manure, if dug in when green. If left to decompose first on the surface, many important gases will escape into the air.

Guano. This valuable and well-known Manure, obtained principally from islands off the coast of Peru, and various other places on the coast of South America, is the excrement of sea-birds. It has been deposited there during the course of centuries, and, since being discovered, its exportation has been so extensively practised as to cause uneasiness lest the supply should become exhausted. The quality of Guano obtained from different places varies considerably; that which is supposed to be the best comes from the Chincha Islands, where the supply has, in consequence, been greatly diminished. The chief fertilising properties of Guano having been ascertained by analysis, various artificial manures are now prepared as substitutes, which are very similar in many respects. Pure Guano is far too caustic for use by itself. It should be mixed with about six times its bulk of loamy or charred soil. Thus prepared, it may be used at the rate of about 4cwt. per acre, or, in a small way, as a top-dressing, by spreading thinly and evenly over the surface. For the purpose of watering plants, the proportion of Guano that may be mixed with water varies according to the sort of plant for which it is required. About 1oz. to two gallons of water may generally be used with safety; some plants will, however, bear a stronger solution.

Horn Shavings, &c. The refuse obtained from the parings of horses' feet at the shoeing forge, and also all the shavings &c., made in the manufacture of various articles from horns, are most valuable as Manures. Horn Shavings are readily mixed in any compost, and are most beneficially employed in those prepared for fruit trees, or for any plants which have to be grown in pots. If the particles are not very small, they last a long time without becoming wholly decomposed.

Leaves. These are invaluable as Manure when reduced to a state of mould by a process of gradual decay. They are most beneficially applied to heavy soils and to plants whose roots require somewhat more than ordinary encouragement. Mixed with stable litter, they tend to prevent violent fermentation, and retain, instead, a moderate amount of heat for a much longer period. *See also* **Leaf Mould.**

Liquid Manure. Manure of almost any description is quicker in its action, and may be employed most effectually, in a liquid state. It has, also, the advantage that it may be applied at any season when nourishment is required, either by growing crops or plants in pots. Urine is generally too powerful for use by itself as a liquid manure; diluted with water, to the extent of two or three parts of the latter to one of the former, it may usually be safely applied. Water collected from a heap of farmyard Manure, exposed to rain, contains in solution many most important fertilising properties, and is, consequently, very valuable. Cow-dung is readily obtained, and forms one of the best and least harmful of substances for preparing Liquid Manure to be applied to crops or plants of any description. It possesses none of the caustic principles so prevalent in chemical preparations, or, at least, not a sufficient quantity to cause injury when properly used with plants requiring a stimulant. It should be thrown in a large tub, and stirred occasionally, to render the water which is added a dark brown colour. The excrement of sheep, deer, fowls, pigeons; &c., are all of a more concentrated and powerful nature than cow-dung; consequently, they must only be used in more limited quantities. Soot is one of the best substances for Liquid Manure, as it

Manures—*continued.*

always tends to produce a fine dark colour and healthy foliage. It should be placed in a bag, and left soaking in a tub of water, which may be used most effectually in a clear state. Liquid Manure is frequently made by adding a small portion of some highly concentrated preparation to a can of water, and applying it at once to the plants it is intended to stimulate. This is a ready and a clean method of preparing it, but one which requires some caution in guarding against the dose being too strong. Guano, as previously stated, may be used at the rate of 1oz. to two gallons of water; with many plants a stronger solution will do no harm; but this knowledge must be gained by experience. Sulphate of ammonia may be used in a similar proportion. All chemical Manures intended for use when dissolved in water, should be tried first in a weak solution, and the strength increased gradually if results warrant it. Liquid Manures, being ready for immediate absorption by plants, are most effectually employed when the latter are in an active state, and in want of a stimulant for assisting the development of their crops, or for sustaining their growth. A tank for collecting the drainings from dunghills, or for the special preparation of Liquid Manure, is very useful in or near a kitchen garden, as a supply may always be kept in readiness for use, and the possibility of waste can also be prevented. A slate tank being practically indestructible, is much better than a tub, but one is not always procurable. It might be 6ft. deep, partially sunk into the ground, and provided with a wooden covering, to prevent leaves falling in, and also to preclude the contents from being exposed to view. A perforated partition is sometimes provided, the solid portions of the Manure being kept on one side, and any of the liquid dipped from the other as it is required. A water supply, either in connection with, or in close proximity to, Liquid Manure tanks, is very important where a large quantity is used.

Malt Dust. This forms a very good Manure, and those who have used it speak highly of its qualities. It must be kept as dry as possible, and used in a fresh state. Being quick in action, it proves valuable as a top-dressing to fruit and other trees; but its effects are not of a permanent character when otherwise applied.

Night-soil. An extremely powerful Manure, and one which is rich in nitrogen. Its proper application to crops is generally attended with good results, but Night-soil is not used nearly so much as it might be, partly on account of its offensive odour. This may be effectually taken away by mixing with a deodorizer, such as dry earth, sifted ashes, or, better still, charcoal, or charred peat. Quicklime is frequently recommended, and answers for the purpose; but it, at the same time, dispels a large proportion of ammonia, which is a great loss to the manurial properties. Night-soil should be prepared in a compost for applying to garden crops; mixed with dry earth or charcoal-dust, it may be used lightly as a top-dressing for fruit-trees, especially vines, and for many vigorous-growing trees or plants.

Sea Weeds. In a fresh state, these are frequently used as Manure near the coast, either for digging in the ground or for a top-dressing. The effect on crops is not a lasting one. When burnt, Sea Weeds yield a large proportion of ash, which is peculiarly rich in soda, and consequently valuable as a Manure.

Soot. The fertilising properties of Soot are very valuable. It has an advantage over many other Manures, as it can hardly be misapplied. It should be kept dry until required for use. As a Manure for land, it may be applied at the rate of twenty bushels, or more, to an acre. Soot may be sown with advantage along the drills intended for Turnip, Onion, Carrot, and similar seeds, as, apart from its manurial properties, it

Manures—*continued.*

materially assists to keep down the larvæ of destructive insects.

Woollen Rags or Refuse. In some places, these are used with great success as a fertiliser for Potatoes and all green crops; but, as they are slow in decomposing, the effect produced is extended over a considerable period. The Rags should be chopped up in small pieces, and buried in the soil.

II. Inorganic Manures.

Ammonia. One of the chief component parts of Manures, and one which has a powerful stimulating action on the growth of plants. It is formed by the decay of organic matter in the soil, and also in the air; and, being very soluble in water, is rapidly brought to a suitable state for assisting vegetation, by a plentiful supply of nitrogen. Ammonia may be supplied to plants by the application of organic Manures capable of forming it, or by the use of ammoniacal salts. These latter must be cautiously employed, as they are extremely powerful, and their effects are almost immediate. As a dressing for land, they may be applied at the rate of about 2½cwt. per acre, in moist weather, or just before rain, which will quickly carry them into the earth.

Ashes. Wood Ashes, and any small pieces of Charcoal that may be left as the remains of a fire, form excellent Manures, suitable for applying by themselves, or intermixing with others which are of a stronger nature. Wood ashes, being usually rich in potash, are specially valuable to plants requiring this element; but they will not supply the want of organic Manure. Charcoal has the important property of absorbing ammonia and other gases, and again giving them off for the nourishment of plants On this account, it is valuable as a deodorizer. Coal Ashes are valuable as manure in some cases, although inferior to the ashes obtained from wood and vegetables. If they contain many cinders, from not having been thoroughly burned, they are more suited to heavy than to light soils, as they tend to mechanical division, which, though beneficial to the former, may be injurious to the latter. Peat Ashes are also of great benefit. The peat must be thrown out, dried, and then burnt until it becomes charred through, and reduced to cinders. These latter form a valuable dressing for the soil.

Gypsum, or Sulphate of Lime, has been applied with success to crops of Turnips, Potatoes, &c., in quantities of one bushel on sandy, to five or six bushels on clay soil. It acts most beneficially on soils which are naturally dry, or have been made so by artificial drainage. It is not much employed as a Manure in this country.

Lime is a valuable Manure for some soils and plants; but to others its application proves very injurious. *See* **Lime.**

Liquor of Ammonia, at the rate of 1oz. to 4 gallons of water, has also a beneficial effect; but, as the strength varies, it should not be applied in larger quantities.

Marls. These are composed of carbonate of lime, mixed with clay, sand, or loam, and frequently with sulphate and phosphate of lime. They are adapted to the improvement of soils which are not already sufficiently charged with lime. Marl is improved by exposure to the sun, and especially to the frosts of winter, before spreading it on the land.

Nitrate of Soda. A powerful Manure, used to a considerable extent, and deemed especially beneficial to grain crops; it is found in large quantities, in beds, and as an incrustation on the soil in some parts of South America. It is imported into this country as a chemical Manure, and also for manufacturing purposes. Its effects are rapid, and very similar to those produced by ammonia.

Manures—*continued.*

Salt. On some soils no apparent benefit is derived from the use of Salt. Such lands as are near the sea-coast, and occasionally receive deposits from the salt spray, which is often carried far inland by storms; or such as contain chlorine and soda in any other form, and in sufficient abundance for meeting the requirements of crops, are not affected by it. But in other situations, when used at the rate of five to ten bushels per acre, very material results have followed. Its great affinity for water has the effect of attracting dews and atmospheric vapour to the growing vegetation. Salt is also useful for destroying slugs, worms, and larvæ.

MAPLE. The common name for **Acer campestre** (which *see*).

MAPPA. Included under **Macaranga** (which *see*).

MARAJA PALM. *See* **Bactris Maraja.**

MARANTA (named after Barthol. Maranti, a Venetian botanist, who died in 1754). Arrow-root. ORD. *Scitamineæ.* A genus comprising about ten species (with numerous varieties) of stove herbaceous perennials, with tuberous or creeping rhizomes. They are natives of tropical America, but are cultivated in the East and West Indies, Sierra Leone, &c. Inflorescence terminal, loosely dichotomous; branchlets few-flowered; pedicels short, one-flowered, often twin, ebracteolate. Leaves sheathed, with or without petioles. Stems sometimes short, few-leaved; sometimes tall, branched, occasionally rather woody at base. The Arrowroot of commerce is extracted from the tubers of several species of this genus. A number of species formerly included under *Maranta* are now removed to *Calathea.* Marantas thrive in a compost of two-thirds good turfy loam and one-third leaf mould and sand, and like abundance of water, heat, and atmospheric moisture when growing. As soon as growth is furnished, the plants should be kept rather dry until the following spring, when they must be shaken out and repotted. The general remarks under **Calathea** (which *see*) apply equally well to Marantas.

M. albo-lineata (white-lined). A synonym of *Calathea ornata albo-lineata.*

M. angustifolia (narrow-leaved). *fl.* pale bluish, in a lax, zigzag panicle. July. *l.* smaller than those of *M. arundinacea,* and narrowed at the base. Trinidad. A smaller plant than *M. arundinacea.* (B. M. 2398.)

M. arundinacea (reed-like). Indian Arrowroot. *fl.* white, very fugitive. July and August. *l.* ovate-lanceolate, rather pilose below. Culm branched. *h.* 6ft. to 10ft. Tropical America, before 1732. (B. M. 2307.)

M. bicolor (two-coloured).* *l.* orbicular, ground colour pale glaucous-green, with irregular-shaped blotches of polished dark olive midway between the midrib and margin; under surface rosy-purple. *h.* 1ft. Brazil, 1823. An old but pretty spreading species. (B. R. 786; L. B. C. 921.)

M. chimboracensis (Chimborazo). *l.* 6in. to 12in. or more in length, ground colour light green, having a zigzag zone of olive-green traversing the entire length, a little distance from the midrib, the outer edge of the zone bordered with white. Ecuador, 1869. An elegant species, with a dwarf and distinct habit. SYN. *Calathea chimboracensis.*

M. concinna (neat).* *fl.* yellow, on short radical scapes. *l.* obliquely ovate, pale bright green, the base of the principal veins marked by an oblong blotch of deep green. South America, 1874. A neat, dwarf, tufted perennial.

M. coriifolia (Coris-leaved). A synonym of *Calathea ornata regalis.*

M. depressa (depressed). *l.* pale green in the centre, with brown blotches. Brazil, 1880.

M. leuconeura (white-veined). A synonym of *Calathea leuconeura.*

M. l. Kerchoviana (Kerchove's). A synonym of *Calathea Kerchoviana.*

M. majestica (majestic). A synonym of *Calathea ornata majestica.*

M. Mazellii (Mazell's). *l.* shining, broad, rotundate, green at centre and margin, and marked with two broad grey bands. South America, 1871. A fine plant.

M. nitens (shining). *l.* palish green, glossy, barred with dark green lines. Brazil, 1880. An elegant ornamental plant.

Maranta—*continued.*

M. pinnato-picta (pinnately-marked). A synonym of *Calathea applicata.*

M. Porteana (Porte's).* *l.* oblong-acuminate, bright green on the upper side, striped with transverse bars of white; under surface rich purple. *h.* 3ft. Bahia, 1859. An elegant, erect-growing species.

M. regalis (regal). A synonym of *Calathea ornata regalis.*

M. roseo-lineata (rosy-lined). A synonym of *Calathea ornata roseo-lineata.*

M. roseo-picta (rosy-painted). A synonym of *Calathea roseo-picta.*

M. sagoriana (Sagorian).* *l.* oblong, very pale green, marked on each side the midrib with oblong-oblique bars of deep green. South America, 1862. A pretty dwarf perennial.

M. smaragdina (emerald-green).* *l.* emerald-green, with a dark green central stripe. Ecuador, 1870. SYN. *Calathea smaragdina.*

M. striata (streaked). *l.* about 5in. long, and 2in. wide, pale green, profusely streaked and striped with white and pale yellow. *h.* 6in. Philippines. A very desirable dwarf-growing species.

M. tessellata Kegeljani (Kegeljan's checkered). A synonym of *Calathea bella.*

MARANTEÆ. A tribe of *Scitamineæ.*

MARASMIUS (from *marasmos*, withering; on account of the plants being dry and leathery). A genus of Mushrooms characterised by not decaying readily, but by being so tough and leathery in all their parts that, after being quite dried, they can resume their form when again moistened. The cap is fixed to the stalk by the middle of the lower surface, and the gills are tough, and are not incised at all. The species are rather numerous. They are usually of small size. The best-known species in the genus is *M. oreades* (the Champignon or Fairy-ring Mushroom), common on lawns as one of the Fungi that make the so-called Fairy Rings.

FIG. 512. MARASMIUS OREADES.

This Mushroom (see Fig. 512) varies from 1in. to 2in. across the cap, and is provided with a stalk about 2in. or 3in. long. It is smooth above, and rather moist, striped at the margin, and pale reddish. The gills are nearly white. It has an agreeable odour, and is much esteemed as an article of food.

MARATTIA (named after J. F. Maratti, an Italian botanist, who published, in 1760, a book, "De Floribus Filicum"). Including *Eupodium* and *Gymnotheca.* ORD. *Filices.* A well-marked genus, comprising about eight species of stove or greenhouse evergreen ferns, extending all round the world within the tropics, and a little beyond the Southern one. Capsules sessile or stalked, four to twelve, concrete in boat-shaped synangia, which consist of two opposite rows of capsules, and open by slits down their inner faces. The species are strong-growing, distinct, and very ornamental, and thrive best in a compost of equal parts loam, peat, and river sand.

Marattia—*continued.*

If Marattias are grown in a stove fernery, they should be placed partially in the water; being swamp-loving plants, they will grow more luxuriantly in such a situation. For general culture, *see* **Ferns.**

M. alata (winged). *sti.* 1ft. to 2ft. long, 1in. or more thick, scaly. *fronds* 3ft. to 4ft. long, tripinnatifid, the lower pinnæ the largest, the ultimate divisions ½in. to ¾in. long, about ¼in. broad, oblong, the edge serrate or crenate; under surface more or less chaffy. *synangia* copious, sub-marginal, half a line to three-quarters of a line long, the sides erect, the attachment oblong or roundish. West Indies, &c., 1793. A very handsome plant, perhaps the best of the genus, thriving well in the cool fernery or conservatory. SYN. *Gymnotheca alata.*

M. attenuata (attenuated). *sti.* 3ft. to 4ft. long, smooth. *fronds* 3ft. to 4ft. long, tripinnate; pinnæ 1½ft. to 2ft. long, lower ones with a stalk 6in. long, and two or three pinnules on each side, the latter with a terminal segment and three or four on each side, which are 4in. to 6in. long, 1in. or more broad, apex serrated, base cuneate, lower ones short-stalked; surfaces naked; rachises not winged. *synangia* sub-marginal, the sides vertical; receptacle linear. Australia, 1863. Greenhouse.

M. cicutæfolia (Cicuta-leaved). *sti.* 1ft. to 2ft. long, 1in. thick, smooth. *fronds* 5ft. to 6ft. long, bipinnate; lower pinnæ, 1ft. to 1½ft. long, often 1ft. broad; pinnules oblong-lanceolate, ½in. to 6in. long, 1in. broad, edge entire or serrulate, base cuneate or slightly rounded; surfaces naked; rachis of pinnæ slightly winged towards the apex. *synangia* a short distance from the edge, deep-cleft. Brazil, 1878. Stove. SYN. *Gymnotheca cicutæfolia.*

M. elegans (elegant). This is a mere form of *M. fraxinea.*

M. fraxinea (ashen). *sti.* 1ft. to 2ft. long, 1in. to 1½in. thick, smooth, scaly and swollen in the lower part. *fronds* 6ft. to 15ft. long, bipinnate or casually tripinnate; pinnæ 1ft. to 2ft. long, often 1ft. broad; pinnules oblong-lanceolate, 4in. to 6in. long, ½in. to 1½in. broad, the apex acuminate, the edge entire or serrulate, the base cuneate or slightly rounded; surfaces naked. *synangia* usually sub-marginal, in close rows, half a line to one and a half lines long, the sides vertical, the receptacle linear, with from six to twelve capsules on each side. Guinea Coast. Stove. "From this," remarks Mr. J. G. Baker, "we cannot separate clearly many plants which have been regarded as distinct," of which the following are believed to be in cultivation: *M. purpurascens*, a reduced, fleshy form, as if grown in a very exposed situation; the fronds not more than from 3ft. to 4ft. high; lower pinnules often cut down to a distinctly-winged rachis. *M. salicifolia*, pinnules sharply toothed throughout, often only ¼in. to ½in. broad. *synangia* with about six capsules on each side, not so close or so near the edge.

M. Kaulfussii (Kaulfuss'). *sti.* 2ft. to 3ft. long, thick, naked. *fronds* 3ft. to 4ft. long, quadripinnatifid; the lowest pinnæ much the largest, all except the lowest pair pinnatifid, 1ft. or more long, 6in. to 8in. broad; pinnules 3in. to 4in. long, the rachis very distinctly winged; segments oblong, deeply and bluntly toothed; surfaces naked. *synangia* half a line to three-quarters of a line long, not marginal, deeply cleft, the sides ultimately spreading. West Indies, &c. Stove. SYN. *Eupodium Kaulfussii.*

M. laxa (loose). *sti.* 1ft. to 2ft. long, smooth. *fronds* several feet long, bipinnate; lower pinnæ 1½ft. to 2ft. long, often 1ft. broad; pinnules oblong-lanceolate, 4in. to 6in. long, ¾in. to 1in. broad, the edge inciso-crenate, the base cordate; surfaces naked; rachis slightly winged towards the apex. *synangia* quite close to the edge, three-quarters of a line to one line long, the sides always erect, the attachment linear. Mexico. Stove. SYN. *Gymnotheca laxa.*

M. purpurascens (purplish). A form of *M. fraxinea.*

M. salicifolia (Willow-leaved). A form of *M. fraxinea.*

MARCESCENT. Permanent; not falling off until the part which bears it is perfected, but withering long before that time; *e.g.*, flowers of *Lobelia, Orobanche*, &c.

MARCGRAVIEÆ. A tribe of *Ternstræmiaceæ.*

MARESTAIL. A common name for **Hippuris vulgaris** (which *see*).

MARGYRICARPUS (from *margaron*, pearl, and *karpos*, a fruit; resemblance in white fruit). Pearl Fruit. ORD. *Rosaceæ.* A small genus (three species) of branched, rigid, leafy shrubs, of which one is broadly dispersed over the temperate regions of South America and the Andes of Patagonia, Brazil, and New Granada, another inhabits Chili, and a third Peru. Flowers small, inconspicuous, solitary in the axils, sessile. Leaves alternate, crowded, imbricated, variable. The undermentioned species is a pretty little hardy evergreen, well suited for the rockery; and should be so planted that its branches can rest on a dark-coloured stone, which will show up the fruit to advantage. A rich, light soil—such

Margyricarpus—*continued.*

as a mixture of sand, loam, and leaf mould—is most suitable. Propagated freely by cuttings, taken in summer, and pricked into moist peat, under a bell glass; or by layering the branches.

FIG. 513. MARGYRICARPUS SETOSUS, showing Habit and detached Portion of Fruiting Branch.

M. setosus (bristly).* *fl.* green, very small, axillary, sessile. All summer. *fr.* white, forming the main feature of attraction, ¼in. to ½in. in diameter, remaining in perfection a considerable time. *l.* impari-pinnate; leaflets awl-shaped, reflexed, deep green. *h.* 2ft. to 4ft. Andes, 1829. See Fig. 513.

MARIANTHUS (from *Maria*, Mary, and *anthos*, a flower; dedicated to the Virgin Mary). ORD. *Pittosporeæ*. A genus comprising about fourteen species of greenhouse under-shrubs, with procumbent, flexuous, or, more frequently, twining branches, limited to Australia. Flowers blue, white, or reddish, in terminal compact panicles, usually corymbose or almost umbellate, rarely solitary; petals connivent at base or above the middle, spreading at top. Leaves entire, toothed, or the lower ones occasionally lobed. This genus is sometimes confused with *Billardiera*, from which it differs in its capsular, not baccate, fruit. The species thrive in a compost of sandy loam and fibry peat, and are admirable plants for training on cylindrical trellises. Propagated, in April or May, by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in gentle bottom heat.

M. cæruleo-punctatus (blue-spotted). *fl.* greyish-blue, each petal with a black spot, in terminal heads. April. *l.*, first ones occasionally toothed or lobed; all the others quite entire; lower ones 3in. to 4in. long, upper ones 2in. to 3in. long. *h.* 4ft. 1840. (B. M. 3893.)

M. Drummondianus (Drummond's). *fl.* lilac; petals ¼in. long sepals hairy; pedicels terminal, one to three together. *l.* from obovate to oblong-lanceolate, mostly acute, or with a small recurved point, toothed or entire, sessile or narrowed into a short petiole; lowest ones sometimes deeply cut. 1865. Young shoots and leaves hairy, or rarely glabrous. (B. M. 5521.)

MARICA (from *maraino*, to flag; referring to the ephemeral nature of the flowers). ORD. *Irideæ*. A genus of about nine species of stove or greenhouse herbaceous perennials, of which one inhabits Western tropical Africa, and the rest are natives of Eastern tropical America. Perianth with three spreading outer, and three smaller inner, segments. Leaves coriaceous, elongate, ensiform. Rhizomes short. The few species in cultivation are very pretty plants, and thrive in a well-drained, rich compost of turfy loam, a little well decomposed manure, and a liberal proportion of sand. When in a growing state, and at flowering time, plenty of water must be supplied.

Marica—*continued.*

Propagated readily by division of the rhizomes, inserting each portion in sand, in a high bottom heat. When both shoots and roots are emitted, the young plants may be potted singly, and treated similarly to established plants. *See also* **Cipura.**

M. brachypus (short-stalked).* *fl.* yellow, barred at the base with horizontal brownish-red stripes. *l.* in a distichous rosette, ensiform, 1½ft. long. West Indies, 1871. A very fine stove species, resembling *M. Northiana* in general appearance. SYN. *Cypella brachypus.* (B. M. 6380.)

M. cærulea (blue). *fl.* blue; claws of outer and inner perianth segments yellowish, barred with transverse bands of brown and orange; scape many-flowered, erect; spathe not viviparous; stigmas united, petal-like. May and June. *l.* bright green, 3ft. to 6ft. long, 1in. to 1½in. broad, acuminate. *h.* 2ft. Brazil, 1818. Stove. (B. R. 713.) SYN. *Cypella cærulea* (under which name it is figured in B. M. 5612).

M. gladiata (sword-shaped). A synonym of *Bobartia gladiata.*

M. gracilis (slender). *fl.*, outer segments of the perianth white or bluish, and variously marked at the base; inner ones small, strangely curved, and spotted with reddish-brown, disposed on viviparous scapes. Summer. *l.* 1in. or more broad, tapering. *h.* 2ft. Brazil, 1830. Greenhouse. (B. M. 3713.)

M. humilis (dwarf). *fl.*, limb of outer perianth segments whitish, with transverse bars of yellow and brown at the base; inner segments, upper portions blue and white, lower yellow, barred with orange-red. *l.* bright green, ensiform, bluntly acuminate. Brazil, previous to 1825. Stove. (L. B. C. 1081.)

M. h. lutea (yellow). A synonym of *M. lutea.*

M. lutea (yellow).* This species much resembles *M. humilis*, but may be distinguished by the following points: *fl.*, outer segment brighter yellow, with five (instead of four) bars of a redder colour; the ends of the inner ones white, with green bars (instead of plain purple). April. *l.* narrower and straighter. Stem short, bracteate; bracts inclosing the ramules longer and straighter. *h.* 6in. Brazil, 1840. Greenhouse. (B. M. 3809, under name of *M. humilis lutea.*)

M. Northiana (North's).* *fl.*, outer segments of the perianth white, yellowish, and elegantly mottled with deep red at the base; inner ones curved, barred with blue at the apex, and veined with red at the base. June. *l.* 2ft. long, 2in. wide. *h.* 4ft. Brazil, 1789. A very handsome stove species, but rarely seen in cultivation. (B. M. 654.)

FIG. 514. AFRICAN MARIGOLD (TAGETES ERECTA).

MARIGOLD, or **MARYGOLD** (*Calendula officinalis*). A hardy annual, cultivated in kitchen gardens for the use of its flowers, which are gathered when open,

Marigold—*continued.*

dried slowly, and stored for use in soups, &c. Seeds should be sown in March or April, in drills 1ft. apart, and the plants thinned, in due course, to a similar distance. There are single and double-flowered varieties cultivated, both forming excellent mixed border plants, apart from their use culinarily as above. The half-hardy annual Marigolds employed in summer bedding and for mixed flower borders, belong to the genus *Tagetes*, the African (see Fig. 114) being *T. erecta*, and the French

FIG. 515. FRENCH MARIGOLD (TAGETES PATULA).

(see Fig. 515) *T. patula*. Lemon and orange-coloured varieties predominate in the African Marigolds, while the French sorts exhibit, in addition to yellow, flower-heads of a rich velvety brown, beautifully striped and marked. Numerous dwarf strains are now obtainable, which, from their compact and floriferous habit, are very desirable and attractive garden plants. They are increased readily by seeds, which should be sown in a frame by the middle of April, and the seedlings afterwards transplanted outside. A moderately rich light soil is most favourable for Marigolds, and a space of about 9in. between the plants should be allowed in bedding arrangements.

MARIGOLD, MARSH. *See* **Caltha.**

MARILA (the native name of the tree in the Antilles). SYN. *Sapphea*. ORD. *Ternstroemiaceae*. A small genus (four species) of very ornamental stove evergreen West Indian and South American trees or shrubs. Flowers disposed in axillary racemes; sepals and petals four or five, latter imbricated. Leaves opposite, petioled, penninerved. The undermentioned is the only species known to our gardens. For culture, see **Mahurea.**

M. racemosa (racemose). *fl.* greenish-white, in axillary racemes. August. *l.* oblong, oblong-lanceolate, acuminate, rounded, entire, full of pellucid dots. *h.* 10ft. West Indies, 1822. Tree or shrub.

MARIPOSA LILY. *See* **Calochortus.**

MARJORAM (*Origanum*). Marjoram is cultivated for the use of its aromatic leaves, either in a green or a dried state, for flavouring and other culinary purposes. The common species (*O. vulgare*) is a native hardy perennial, seldom grown in gardens. Two species generally cultivated are Sweet or Knotted Marjoram (*O. Majorana*),

Marjoram—*continued.*

and Pot Marjoram (*O. Onites*). Sweet Marjoram is not an annual, but is usually treated as such, as the plants will not stand the winter outside. Seeds may be sown, for an early supply, in March, on a gentle hotbed, and again, in a warm position, in the open ground, during April. The plants may be thinned, when large enough, to 6in. or 8in. apart. Cut the tops as they begin to flower, about July, and dry them slowly in the shade, for use in the following winter and spring. Pot Marjoram is a hardy perennial, which prefers a warm situation and a rather light soil. It is usually increased by divisions, in early spring, or by cuttings, inserted under a hand glass, in summer. A space of 1ft. between the rows, and nearly as much from plant to plant, should be allowed. The tops should be dried and preserved in the same way as Sweet Marjoram, and they may also be used for similar purposes.

MARLEA (its native name in Assam). SYNS. *Pseudalangium*, *Rhytidandra*, *Stylidium*, *Stylis*. ORD. *Cornaceae*. A small genus (four or five species) of glabrous, pubescent, or tomentose, greenhouse trees or shrubs, natives of tropical and sub-tropical Asia, the warmer parts of Australia, and the Pacific Islands. Flowers white, hermaphrodite, disposed in axillary, simple or dichotomous cymes, with articulated pedicels; petals four to eight, free, or cohering at the base of the tube. Leaves alternate, petiolate, membranaceous, oblong-lanceolate or broadly cordate, acuminate, oblique, entire or angularly lobed. The species best known to cultivation is *M. begoniaefolia*. It thrives in a compost of sandy loam and peat. Propagated by cuttings of short side shoots, detached with a heel, and inserted in sand, under glass.

M. begoniaefolia (Begonia-leaved). *fl.* yellowish, in axillary dichotomous cymes. Summer. *l.* alternate, cordate-ovate, petiolate, unequally cordate, acuminate, angularly lobed or entire. An evergreen shrub or tree, often small, but sometimes attaining a height of 50ft. Northern India, China, and Japan, 1824. (B. R. xxiv. 61.)

MARMORATE. Marbled; traversed by irregular veins of colour.

MARROW, VEGETABLE. *See* **Cucurbita Pepo ovifera** and **Vegetable Marrow.**

MARRUBIUM (the old Latin name used by Pliny, probably derived from the name of a town in Italy). ORD. *Labiatae*. A genus comprising about thirty species of hardy perennial, usually tomentose or woolly herbs, of no horticultural value. Flowers in generally many-flowered axillary whorls. Leaves wrinkled, rarely cordate at the base, usually cut; floral leaves similar, exceeding the flowers. *M. vulgare* is the common **Horehound** (which see for culture).

MARSDENIA (named after William Marsden, F.R.S., 1754-1836, author of a History of Sumatra). Including *Harrisonia*. SYNS. *Lachnostoma* and *Stephanotis*. ORD. *Asclepiadeae*. This genus comprises about sixty species of stove, greenhouse, or half-hardy, twining or rarely sub-erect shrubs or sub-shrubs, dispersed over the tropical regions of the New, as well as the Old, World, with one species extending to the East Mediterranean region. Flowers small or medium, much smaller than in *Stephanotis*; calyx five-parted; corolla campanulate, urceolate, or rarely salver-shaped or sub-rotate. Leaves opposite. Marsdenias thrive in a sandy loam, with a little leaf mould or peat. Propagated, during April or May, by cuttings, inserted in sand, under a bell glass, in gentle bottom heat.

M. Cundurango (Cundurango). *fl.* whitish; corolla between bell-shaped and wheel-shaped, very fine. Summer. *l.* stalked, oblong-cordate, acute or acuminate, with greyish-yellow hairs beneath. Central America. Stove climber. SYN. *Gonolobus Cundurango*.

M. erecta (erect). *fl.* white, sweet-scented, numerous; segments of the corolla and beardless; cymes umbel-formed. July.

Marsdenia—*continued.*

l. cordate-ovate, acute. Stem erect. *h.* 3ft. to 6ft. South-east Europe and Asia Minor, 1597. Half-hardy sub-erect shrub.

M. flavescens (yellowish). *fl.* yellowish; cymes many-flowered; corolla sub-rotate. June and July. *l.* oblong-lanceolate, acuminated, somewhat undulated, glabrous above, clothed with hoary tomentum beneath. New South Wales, 1823. Stove twining shrub. (B. M. 3289.)

M. loniceroides (Lonicera-like). *fl.* red; corolla fleshy, urceolate; umbels pedunculate, terminal. Autumn. *l.* opposite, decussate, 2in. to 3in. long, elliptic-cordate, obtuse. *h.* 6ft. Brazil, 1825. Erect stove shrub. (B. M. 2699, under name of *Harrisonia loniceroides.*)

M. maculata (spotted). *fl.* variegated, pale green and purplish-brown; cymes umbelliform, sub-sessile; sepals roundish, ciliate; corolla rotate-infundibular. June to August. *l.* broad-elliptic, spotted, cordate. *h.* 20ft. Trinidad, 1834. Plant glabrous. Stove climber. (B. M. 4299.)

M. suaveolens (sweet-scented). *fl.* white, fragrant; corolla with a ventricose tube and a bearded throat; panicles axillary, six to eight-flowered. July. *l.* oval-lanceolate, glabrous, veinless. Stem erect or twining. *h.* 2ft. to 3ft. New South Wales, 1816. Greenhouse shrub. (B. R. 489.)

M. tenacissima (very tough). *fl.* greenish-yellow; corolla salver-shaped, segments broad, obtuse; cymes large. June. *l.* cordate, acuminated, tomentose on both surfaces. Stem twining. India, 1806. Greenhouse shrub.

MARSHALLIA (named after Humphrey Marshall, an American botanical author, who published, in 1785, a list of the trees of the United States). SYNS. *Persoonia* (of Michaux), *Therolepta, Trattenikia.* ORD. *Compositæ.* A genus comprising four species of hardy perennial herbs, natives of North America. Flower-heads purplish or rose, resembling those of a Scabious, solitary; involucral scales linear-lanceolate, leafy, in one or two rows; receptacle convex or conical, chaffy; florets all tubular. The undermentioned species (the only one cultivated) is interesting rather than handsome, and is very suitable for borders in any light soil. Propagated by seeds, sown in a warm border, during late spring.

M. cæspitosa (tufted).* *fl.-heads* bluish-white, about 1½in. across. June. *l.* alternate, entire, glabrous, tufted. Stems several from the same tuft. *h.* 1ft. Texas, 1837. (B. M. 3704.)

MARSH CINQUEFOIL. *See* **Comarum.**

MARSH MALLOW. *See* **Althæa.**

MARSH MARIGOLD. *See* **Caltha.**

MARSH TREFOIL. *See* **Menyanthes trifoliata.**

MARSILEA (named after Count A. F. Marsigli, of Bologna, 1658-1730, a patron of botany). ORD. *Marsileæ.* This genus comprises about four species of aquatic plants, widely distributed. The two species described below are abundant in Australia. Two others are found in Europe, &c. Rhizome creeping, rooting at the nodes. Stipes often, but not always, confined at the base with those of the barren fronds, as in *Ophioglosseæ.* Barren fronds with a long petiole or stipes, the lamina divided into four digitate leaflets, with numerous forked veins radiating from their base. Sori linear, on transverse veins proceeding from the upper side or midrib of the involucre into two series of transverse cells; each sorus consists of a few macrosporangia, each one surrounded by several microsporangia; involucres sessile or stipitate. The species thrive in turfy loam or peat, and the pots in which the plants are growing should be partially plunged in water.

M. Drummondii (Drummond's). Stipes of the barren fronds usually long and slender; leaflets broadly obovate-cuneate, or fan-shaped, more or less crenate or shortly lobed, or rarely quite entire. *involucres* larger than in *M. hirsuta*, the stipes or peduncles clustered, free from the base. Ends of the rhizome, under side of the leaflets, and involucres, more or less silky-hairy. SYN. *M. macropus* (H. G. F. 63).

M. hirsuta (hairy). Young ends of the rhizome densely rusty-villous. Leaflets obovate or broadly cuneate, sparingly or densely hirsute underneath, the stipes usually long and slender. *involucres* small, usually clustered, sessile at the base of the barren fronds, or on a stipes shorter than the involucre.

M. macropus (long-stalked). A synonym of *M. Drummondii.*

MARSILEÆ. A small order of aquatic plants, of variable habit. There are no true leaves. Fronds, as in *Filices*, proceeding from the rhizome, and rolled inwards (circinate) at the top when young; barren ones either reduced to a linear stipes or bearing a leaflike lamina divided into four digitate leaflets; fertile ones on a shorter stipes or nearly sessile, the lamina recurved with the margins united, forming an ovoid or globular utricle, usually called an involucre. Spore cases of two kinds, as in some *Lycopodiaceæ*, but arranged, as in *Filices*, in sori inside the involucre (*i.e.*, on the under surface of the recurved frond); each sorus inclosed in a membranous indusium, apparently dividing the involucre into as many cells. The order is limited to the two Australian genera, *Marsilea* and *Pilularia*, both of which have a wide range in the New, as well as in the Old, World. According to Bentham, they might well be regarded as forming a tribe of *Filices*, to which they are much more closely allied than to *Lycopodiaceæ*, with some genera of which they have been frequently associated. The sporangia of *Marsilea*, after the pools in which the plants grow are dried up, are found in great abundance on the surface of the soil, and form a miserable article of food, which has, however, saved the lives of some of the exploring parties who have traversed Australia.

MARTAGON LILY. *See* **Lilium Martagon.**

MARTINEZIA (named in honour of Balthassar Martinez, a Spanish naturalist). SYN. *Aiphanes.* ORD. *Palmeæ.* A small genus (about seven species have been described) of very ornamental stove palms, rarely exceeding 20ft. in height, natives of tropical America. Flower-spikes simply branched, inclosed in a double spathe, the outer of which is incomplete. Fruit yellow, scarlet, or pink. Leaves pinnate; segments wedge-shaped or three-sided, the broad upper end very much jagged. Trunks cylindrical. The few species in cultivation thrive in a compost of sandy loam and peat, in about equal parts. A strong heat, and an abundance of water, are most essential to success. Propagated by seeds.

M. caryotæfolia (Caryota-leaved).* *l.* full dark green on both surfaces, pinnate, 3ft. to 6ft. long; pinnæ cuneate, præmorse, 6in. to 12in. long, 4in. to 6in. broad at the apex. Several pairs of pinnæ are produced in close proximity, at intervals of about 6in. to 10in. apart. Stem slender, and, as well as the petioles and back of the leaves, densely clothed with long black spines. New Grenada, 1845. (G. C. 1872, 171.)

FIG. 516. MARTINEZIA EROSA.

M. erosa (bitten). *l.* pinnate, consisting of a few pairs of narrowish leaflets at the base, and a pair of broader ones at the apex, all obliquely erose; both stalks and blades, the latter both above and beneath, thickly furnished with long, brown, needle-like spines, which, in the case of the blades, are developed from the rather prominent veins; leafstalks mealy. South America, 1871. See Fig. 516. (G. C. 1872, Fig. 296.)

Martinezia—*continued.*

M. granatensis (New Grenadan).* *l.* roundish-oblong or roundish-ovate in outline, entire at the base, bifid at the apex, evenly toothed along the edges; petioles and rachis armed with dark brown, needle-shaped spines, which vary from ½in. to 1in. long, and are spreading or deflexed. Columbia, 1874.

M. Lindeniana (Linden's). *l.*, upper surface bright green, paler below, pinnate; the terminal pinnæ much the larger; petiole sheathing, profusely armed with long, slender, black spines. *h.* 16ft. Columbia, 1869. (I. H. n. s. 99.)

MARTINIERIA. A synonym of **Kielmeyera** (which *see*).

MARTYNIA (named after John Martyn, F.R.S., 1699-1768, once Professor of Botany at Cambridge, author of "Historia Plantarum Variorum"). ORD. *Pedalineæ.* A genus comprising about ten species of erect or prostrate, clammy-pubescent, greenhouse herbs, sometimes annual, sometimes with a large tuberous perennial root, natives of the warmer regions of America. Flowers pink, violet, or pale yellowish, in short terminal racemes; corolla tube oblique or decurved at base, limb with five spreading lobes. Capsule sub-drupaceous, terminating in two curved beaks or hooks

FIG. 517. FRUIT OF MARTYNIA LUTEA.

(see Fig. 517). Leaves opposite or alternate, long-stalked, cordate, thickly sinuate-toothed or palmately lobed. The best-known species is *M. fragrans.* This thrives in well-drained porous soil, in a warm, sheltered situation. Seeds should be sown, during the early part of spring, on a gentle hotbed, or in a warm, moist greenhouse, and the seedlings transferred to the open border about the latter part of June; or they may be grown on in pots for greenhouse decoration, if desired. The other species require similar treatment. All those described below are annuals.

M. annua (annual). A synonym of *M. proboscidea*

Martynia—*continued.*

M. diandra (diandrous). *fl.*, thyrsoid in the forks of the stem, drooping; corolla with a white tube, tinged with purple, and spotted with red and yellow; limb pale red, with a slimy purple spot at each segment. July. *l.* opposite, lobed, cordate at the base, villous and viscid. Stem branched. *h.* 2ft. Mexico, 1751. (A. B. R. 575; B. R. 2001.)

M. fragrans (fragrant).* *fl.* crimson-purple, with a yellow throat, large, fragrant, disposed in handsome spikes. Summer and autumn. *fr.* very singular, prolonged upwards into two curved, sharp, hooked horns, 3in. to 4in. long. *l.* large, long-stalked, cordate, angled, coarsely-toothed. *h.* 2ft. Mexico, 1840. If gathered when very young, the fruit is said to make an agreeable pickle in vinegar. (B. M. 4292; B. R. xxvii. 6.)

M. lutea (yellow). *fl.* orange-yellow, suffused with blood-colour inside, large, funnel-shaped. August. *l.* opposite, cordate-orbicular, toothed, clothed with glandular down. Stem branched, downy. *h.* 1ft. to 2ft. Brazil, 1825. See Fig. 517. (B. R. 934.)

FIG. 518. MARTYNIA PROBOSCIDEA, showing Habit and detached Portion of Inflorescence.

M. proboscidea (proboscis-like).* *fl.* with a yellowish-white tube, variegated with green, yellow, and violet spots and lines; limb wide, pale violet, marked with saffron-coloured and violet dots and lines. July. *l.* alternate, lobed, cordate at the base. Stem branched. *h.* 1ft. to 3ft. Mexico, 1738. SYN. *M. annua.* See Fig. 518. (B. M. 1056.)

MARVEL OF PERU. *See* **Mirabilis Jalapa.**

MARYGOLD. *See* **Marigold.**

MASCARENHASIA (from the Mascarene Islands, where it is found). ORD. *Apocynaceæ.* This genus comprises about four species of stove shrubs or small trees, natives of Madagascar. Flowers whitish-purple, sub-sessile in the nodes, fasciculate or sub-solitary, terminal, or in one species scarcely axillary, large; calyx small, five-parted, the segments ovate or narrow; corolla salver-shaped, the tube cylindrical, the throat contracted, lobes five, ovate, twisted. Leaves opposite. For culture of the under-mentioned species, *see* **Dipladenia.**

M. Curnowiana (Curnow's).* *fl.*, corolla scarlet, glabrous; tube ⅝in. long, swollen above; lobes nearly 1in. long, ovate-lanceolate, acuminate; calyx of five subulate, erect teeth, much shorter than the corolla tube; cymes terminal, few-flowered; peduncles rather longer than the petioles; pedicels shorter. August. *l.* opposite, 3in. to 4in. long, shortly stalked, oblong or oblong-lanceolate, entire, obtusely pointed, the base acute and rounded; petioles ½in. long. A slender shrub. (B. M. 6612.)

MASDEVALLIA (named after Dr. Masdevall, a Spanish botanist and physician). ORD. *Orchideæ.* Of this genus upwards of 150 have been described as species. They are cool-house epiphytal orchids, inhabiting the cool, wooded, mountainous regions of tropical America, from Peru to Mexico, a few being found in Brazil and Guiana. Flowers often beautifully coloured or variously spotted, medium or rather large, borne generally singly, but sometimes two or several, on radical stalks; sepals joined into a tube, except at their apices, where they are free, and drawn out into long, narrow tails; petals free, very small, concealed in the tube of the sepals, as is also the lip, which is sessile and articulated

Masdevallia—*continued.*

with the incurved, half-rounded column. Leaves coriaceous, narrowed downwards into petioles. Until a few years ago, Masdevallias did not find favour with English orchid-growers. This may, perhaps, be accounted for by the fact that the earliest introduced kinds were amongst the least showy of the whole genus. There is, however, another reason why the culture of Masdevallias has not yet become general, and that is, the difficulty of transit. Gathered in the high and cool mountain ravines of the Andes of Peru and New Grenada, at from 7000ft. to 10,000ft. elevation, they are packed in boxes, and have, perchance, to make a journey upon a mule's back for some two or three weeks before they reach the port of embarkation, every day's journey bringing them into a hotter region. The effect of this is that the plants are soon shrivelled up; and, as they have no pseudo-bulbs, in which to store nourishment, they are, in many instances, found, upon arrival in this country, to be a mass of useless rubbish. The plants flower two or three times in the course of the season. Masdevallias are not difficult to cultivate; indeed, there is, probably, no other genus of orchids which can be grown with so little trouble as the one under notice, providing always they have a cool, moist atmosphere, and are well shaded from the sun in summer. The plants thrive in peat and sphagnum, with good drainage, and are propagated by division.

M. abbreviata (shortened). *fl.* white, with a few purple spots; racemes few-flowered. *l.* spathulate, obtuse. Columbia, 1878. Closely allied to *M. polysticta*, but the flowers have usually far fewer dots.

M. amabilis (lovely).* *fl.* orange-carmine. *l.* oblong-ovate, about 5in. long. *h.* 6in. Peru, 1874. A very pretty, free-flowering species. (I. H. n. s. 196.)

M. anchorifera (anchor-bearing). *fl.* purple; the borders of the side sepals ochre, with purple spots; tails recurved raceme distichous; peduncle smooth. Costa Rica, 1884.

M. Arminii (Armin's). *fl.* rose-coloured, tinged with purple when expanded.

M. attenuata (attenuated). *fl.* greenish-white; sepaline tails orange-yellow; petals white, with a green middle nerve; lip yellow. *l.* long-stalked, linear-ligulate. Costa Rica, 1871. (B. M. 6273.)

M. Backhousiana (Backhouse's).* A fine species or variety, closely related to *M. Chimæra*, but the colours are much brighter and the flower much larger. Columbia, 1879.

M. Barlæana (Barla's). *fl.* scarlet, very freely produced. Peru, 1876. A pretty species, closely allied to *M. amabilis*.

M. bella (handsome).* *fl.* dark purplish-brown, yellow inside, large; the odd sepal and the outer halves of the other sepals are densely blotched with dark purplish-brown, the colour of the long tails; the interior sides of the equal sepals and the base of the odd sepal are nearly ochre-yellow in colour. Columbia, 1878. (B. H. 1884, 57; G. C. n. s., xiii. p. 756.)

M. brevis (short). *fl.*, upper sepal yellow, with three rows of purple spots and a dark purple tail; lateral ones having the upper front area orange and purple, the rest brown; petals yellowish and brown, rhomboid, with an inflexed point; lip long, narrow, stalked, with a pandurate fimbriate blade. British Guiana, 1884.

M. calura (beautiful-tailed). *fl.*, petals and lip brownish-purple, the inner surface covered with obtuse warts; column white, with numerous purple freckles; tails long. 1883.

M. campyloglossa (curved-lipped). *fl.* greenish-white, smaller than in *M. coriacea*, with nine purplish black dots over the nerves; tails narrower, split half the length of the perigone; lip whitish, with three violet stripes, long, narrow, acute, angled on each side near the apex. 1878.

M. chelsoni (Chelsea).* *fl.* white; lip pandurate, mauve at the border, brown at the blunt apex, white on the disk of the inner side, with a mauve line through the middle line beneath. *l.* with a very long petiolar part. 1880. A hybrid between *M. Veitchiana* and *M. amabilis*: it is believed to be the first Masdevallia raised from seed in Europe.

M. Chestertoni (Chesterton's). *fl.* greenish-sulphur, spotted black; sepals ovate, with black tails; petals orange, with two black spots and a tumour. Columbia, 1883. Allied to *M. Nycterina*.

M. Chimæra (Chimæra).* This plant is distinguished from *M. Wallisii* (which is usually grown under the name of *M. Chimæra*) by its very long, acuminate, tapering, triangular sepals, 10in. to 12in. long, blackish, dotted, and hairy, and by the lip having no angle at its base. (G. C. n. s., xvi. Fig. 26.)

Masdevallia—*continued.*

M. civilis (civil). *fl.* greenish-yellow, spotted inside with brown; sepals fused into a tube, terminating in three slender tails. *l.* fleshy, 4in. to 6in. long. Peru, 1864. (B. M. 5476.)

M. coccinea (scarlet).* *fl.*, sepals yellow outside, and, to use the words of Dr. Lindley, as red as a soldier's coat within; lower sepals expanded and folded back, whilst the upper sepal is narrow and inclined to reflex. Winter. Pamplona, New Grenada. A rare but handsome species. (R. G. 870; R. X. O. 74.)

M. coriacea (leathery). *fl.* yellowish, spotted with brownish-purple. *h.* 6in. Columbia, 1872. An interesting species.

M. corniculata (horned). *fl.* dark cinnamon-brown, as large as those of *M. coriacea*; petals terminating in an ascending, columnar, warty body. Columbia, 1878.

M. crassicaudata (thick-tailed). A variety of *M. polysticta*.

M. cucullata (hooded). *fl.* glossy blackish-purple, whitish inside at base; tips of tails yellow. Columbia, 1883. A fine species.

M. Davisii (Davis').* *fl.* rich orange-yellow, solitary. *l.* about 8in. long. Peru, 1874. A distinct and handsome species. (B. M. 6190.)

M. Dayana (Day's). *fl.*, upper sepal yellowish-white, with seven membranous keels spotted with purple; inferior connate sepals orange, with some purple-brown spots and borders towards the apex. *l.* flat, dark green above, purple beneath, 4½in. by 3in. Columbia, 1880.

M. Denisoniana (Denison's). *fl.* dark crimson, with a magenta flush, very brilliant. Columbia, 1873. Plant of dwarf tufted habit. (F. M. n. s. 79.)

M. Eduardi (Edward Klaboch's). *fl.* red, two or three, borne on peduncles nearly 9in. high. *l.*, blades scarcely above ½in. long and ⅜in. wide, produced at intervals of about 1in. along the creeping rhizome. Columbia, 1880. A pretty species.

M. ephippium (saddle).* *fl.* dark purplish-brown, with very long yellowish tails; veins of lower sepals washed outside with yellow; scape pluriflorous. *l.* oblong, obtuse, with long petioles. *h.* 1ft. Antioquia, 1874. SYN. *M. Trochilus*. (B. M. 6208; R. X. O. 195.)

M. erinacea (prickly). *fl.* light ochre, with a dark purple ring on the rough ovary, and a few scattered spots, small; tails and disks of lateral sepals orange. *l.* linear-spathulate, 2in. long, obscurely tridentate. 1881. A small species.

M. erythrochæte (red-bristled).* *fl.* white and light yellow; sepals covered inside with styliform processes; tails reddish-purple; peduncles 4in. long. *l.* 1ft. long, ¾in. broad. Central America, 1882. This resembles *M. Houtteana*, but is larger.

M. Estradæ (Estrada's).* *fl.* with a purplish-mauve ground colour, the long sepals being pale yellow; scape erect, one-flowered. April. *l.* oblong-ovate, coriaceous, deep green, about 4in. long. New Grenada, 1874. A dwarf and profuse-flowering species. (B. H. 187[illegible], 21; B. M. 6171.)

M. floribunda (bundle-flowered).* *fl.* in a terminal umbel or corymb; petals white, with a triangular or square production on the inferior side, and a keel on the blade, retuse at its top, with three teeth; inferior sepals rounded at the top and suddenly extended into a short tail; the very small free part of the upper sepal is triangular, tapering into a tail; the tails are of a pretty yellow; lip nearly cordate at the base, constricted before the middle, whitish, with numerous brownish-purple spots. *l.* rather thick, spathulate, shining. Brazil, 1843.

M. Gargantua (Gargantua). *fl.* leather-yellow; lower part of tube velvet-purple, with three whitish stripes on each side; lip blackish-purple, rough; petals and column white, striped with lake. Columbia, 1876.

M. Gaskelliana (Gaskell's).* *fl.* mauve-purple outside, with two yellow areas at the base and apex of the lateral sepals, and light yellowish, spotted with mauve, inside; tails mauve-purple. *l.* narrow-lanceolate, acute, 4in. long. 1883. An elegant plant.

M. gemmata (twin).* *fl.*, dorsal sepal ochreous, triangular, with an orange tail of equal length; lateral sepals larger, oblique, ochreous at base, with orange nerves, the front part purple; tails orange, nearly as long as the body of the sepal; lip purple, cordate. *l.* linear-cuneate, 2in. long, obscurely tridentate at apex. 1883. A pretty dwarf species.

M. gibberosa (warted). *fl.* dark reddish; sepals connate at base, ascending, curved and bent when free, tails of lateral ones green; pedicels jointed to the ovaries; peduncle loosely racemose, covered with numerous warts. *l.* cuneate-ligulate, acute, very narrow above the articulation. *h.* 6in. Columbia, 1876.

M. gracilenta (slender). *fl.* blackish-purple, solitary or in pairs. *l.* oblong, acute, minutely three-toothed. Stems slender, 5in. to 7in. high, including the leaves. Costa Rica, 1875.

M. Gustavi (Gustav Wallis's). *fl.* yellowish, with a profusion of port-wine-coloured dots, and yellow tails, ½in. long, racemose. *l.* slender, lanceolate, on long petioles. New Grenada, 1875.

M. Harryana (Mr. Harry Veitch's). A synonym of *M. Lindeni*.

M. heteroptera (various-winged). *fl.* quite open; upper sepal yellow, transversely barred with blackish-purple, oblong, with a short yellow tail; lateral sepals blackish-purple, narrower, convolute, with longer yellow tails; petals white; lip blackish-purple. New Grenada, 1875. A very pretty dwarf plant.

M. hieroglyphica (hieroglyphic). *fl.*, upper sepal erect, flat, with three dark lines and numerous dark spots; lateral ones

Masdevallia—*continued.*

nearly square, marked with a dark purple-brown area, and the long tails suddenly bent down. Columbia, 1882. A distinct plant.

M. Houtteana (Van Houtte's). *fl.*, sepals creamy-white, profusely spotted with blood-red, broad, each lengthened out into a thick, terete, red tail, and measuring from 2in. to 3in. long; scape one-flowered. July. *l.* 1ft. long, ¼in. broad. Columbia, 1874. (F. d. S. 2106.)

M. hypodiscus (beneath-disk). *fl.* deep purplish-violet, with a long narrow opening on each side, and having numerous whitish fringed crests all over the principal veins. *l.* lilac-purplish beneath, on long bent petioles. 1878. A fine species.

FIG. 519. FLOWER OF MASDEVALLIA IGNEA.

M. ignea (fiery).* *fl.* of a bright fiery red, often deeply shaded with crimson or violet-rose; upper sepal narrow, especially towards the apex, bent over the flower, by which peculiarity this species is easily recognised; scape one-flowered. *l.* on long petioles, oblong, obtuse. *h.* 6in. Columbia, 1871. The dazzling lustre of the flowers "is due to the refractive power of the fluid contained in the superficial bladdery cells of the sepals, and is, perhaps, unsurpassed for brilliancy in the vegetable kingdom." See Fig. 519. (B. M. 5962.) The variety *Marshalliana* has yellowish flowers, while *Stobartiana* has mauve-purple nerves.

M. inæqualis (unequal). *fl.* yellowish-white, finely spotted with purple, somewhat cup-shaped, but well expanded, with three slender tails, 1in. long. *h.* 6in. Columbia, 1874.

M. inflata (inflated). A species resembling *M. corniculata*, but the triangular bract is much wider and shorter, keeled at back. The flower is shorter, orange-yellow, and very much inflated.

M. infracta (broken). *fl.* whitish, dotted with brown, and furnished with yellow tails. Brazil, 1835. (B. H. 1873, 22.)

M. ionocharis (violet-beauty).* *fl.* whitish-yellow, with a large purplish blotch, and a few similar smaller ones. September. *l.* oblong, with a very narrow petiolar part. *h.* 4in. Peru, 1875. (B. M. 6262.)

M. Klabochorum (Klaboch's). *fl.* blackish-grey outside, white inside, with petals, lip, column, and tails yellow, when fully open 3in. in diameter from tip to tip of tails; peduncle one-flowered. *l.* oblong, obtuse. South-west America, 1876. A very distinct plant.

M. lata (broad). *fl.* dark brownish-red; broad lateral sepals forming part of tube very concave; tails yellowish; peduncle thin, two-flowered. Central America, 1877.

M. Lehmanni (Lehmann's). *fl.* orange-yellow; peduncle 9in. high. *l.* oblong, acute, shorter than the peduncle, on long petioles. Ecuador, 1877. This plant is something in the way of *M. polysticta*.

M. leontoglossa (lion's-tongue). *fl.* lemon and ochre, spotted with dark purple; lateral sepals united nearly to their apex; petals white, with two purple streaks; lip also white, with purple warts and blotches. 1881.

M. Lindeni (Linden's).* *fl.* brilliant violet, rose, or magenta, with a white eye, borne singly on a peduncle, which is considerably longer than the leaves. Winter and early spring. *l.* oblong-lanceolate. New Grenada, 1869. SYN. *M. Harryana*. See Fig. 520. (F. M. 28.) The following are, amongst others, three handsome varieties: *acanthifolia*, with rich violet-rose coloured flowers; *conchiflora*, with rich rosy-lake flowers; and *regalis*, with dark glowing crimson flowers.

M. Livingstoneana (Livingstone's). *fl.* greenish-yellow, with an elongated cup, brown at the apex; lateral sepals having dark purplish-brown, eye-like spots at the base. *l.* spathulate-obovate, obtusely emarginate. Panama, 1874. Habit tufted.

Masdevallia—*continued.*

M. longicaudata (long-tailed). *fl.* rosy-white, deep rose inside, bell-shaped; tails upwards of 1in. long; scapes one or two-flowered. *l.* elliptic-oblong, fascicled. Brazil, 1869. (I. H. 1868, 109.)

M. ludibunda (sportive). *fl.* light yellowish, purple-spotted; tails dark yellowish. Columbia, 1882. This form resembles *M. Estradæ*, but the sepals are rounder, the tails longer, and the lip pandurate. (F. & P. 1882, 37.)

M. macrodactyla (long-fingered). *fl.* greenish-yellow, racemose; lip blackish-purple. *l.* cuneate-oblong. New Grenada, 1872.

M. macrura (long-tailed). *fl.* solitary; "the wide tube itself is very short, of firm texture, and slit into an upper and an inferior lip; the upper lip forms a short triangle, extending in a long, strong tail; the inferior lip is longer and broader, dividing in two long, strong, spreading tails; these tails are light yellow, the bodies themselves of the sepals light brownish, with dark purplish-brown spots; the petals, column, and lip, form, as usual, a small body, yellowish, with purplish dots, the middle lobe of lip being orange-yellow" (Reichenbach). Winter. *l.* 2in. to 3in. long. *h.* 1ft. Columbia, 1874. (G. C. n. s., vii. p. 13.)

M. maculata (spotted). *fl.*, sepals 2½in. long, the upper ones yellow, the lower ones purple, tipped with green. *l.* spathulate. New Grenada, 1873. (F. d. S. 2150.)

FIG. 520. MASDEVALLIA LINDENI.

M. marginella (margined). *fl.* white, with the three main ribs and tail green, the latter bordered with orange, and orange outside; lobes and tails spreading, the latter as long as the rest of the flower; raceme one or two-flowered. *l.* broadly spathulate, shortly stalked. 1883.

M. melanopus (black-stalked).* *fl.* white, with purplish dots and yellow tails. *h.* 6in. Peru, 1874. (B. M. 6258, under name of *M. polysticta*.)

M. melanoxantha (blackish-yellow). *fl.* 1in. long, with a short yellow tube; upper sepal yellowish, linear, acuminate; lower ones whitish-green outside, covered with small brownish warts, broader, bifid. *l.* ligulate, 1in. long, attenuated at base. New Grenada, 1875. A curious orchid.

M. Mooreana (Moore's). *fl.* yellowish or light green outside, with darker nerves and a reddish hue under the lateral sepals; inside chocolate-brown, very rough; tails long. 1884.

M. muscosa (mossy). *fl.* yellowish, reddish-nerved; petals with very peculiar dilated apices; lip deep violet, bearded; peduncles hispid, two-flowered. New Grenada, 1875.

M. myriostigma (many-dotted). *fl.* yellowish, with small brown dots. *l.* oblong-spathulate. Mexico, 1874. A peculiar plant. (B. H. 1873, 23.)

Masdevallia—*continued.*

M. Nycterina (Nycterina). *fl.* pale yellow, finely blotched with reddish-brown, and covered with minute hairs; triangular in shape. *h.* 8in. Columbia, 1873. A pretty species for growing in a basket; it was first sent out by Linden as *M. Chimæra*, to which, however, it is much inferior. (F. M. n. s. 150; G. C. n. s., xvi. 337.)

M. pachyantha (thick-anthered). *fl.* yellowish-ochre, or green lilac-brownish, with dark nerves on the upper sepals, and fainter ones on the lateral sepals; upper sepals triangular, with a long, thick tail; lateral ones deeply connate, with a short, thick tail. Columbia, 1884. This species somewhat resembles *M. Gargantua*.

M. pachyura (thick-tailed). *fl.* yellow, small, with numerous brownish-red spots, disposed in many-flowered racemes. Northern Peru, 1874.

M. Parlatoreana (Parlatore's). *fl.* salmon-colour outside, finest scarlet, with amethyst warts, inside; lip oblong, with obscure lateral blunt lobes, white, with a very dark violet spot at the top. Peru, 1879. Allied to *M. Barlæana*.

M. Peristeria (dove). *fl.* honey-coloured, with very strong green ribs outside; lip amethyst-coloured. *h.* 6in. Columbia, 1873. (B. M. 6159.)

M. picturata (variegated). *fl.*, sepals whitish, oblong, quite free, with green nerves and tails, and spotted with blackish-purple, the lateral ones orange at the base; peduncles one-flowered. *h.* 2in. to 3in. Columbia, 1882. A small but pretty species.

M. platyglossa (broad-tongued). *fl.* light yellowish, small; tails short; lip broad, full of acute warts at the top. 1883.

M. polysticta (many-dotted).* *fl.* white, beautifully spotted with dark crimson; scape six to eight-flowered. *h.* 6in. Peru, 1874. One of the most attractive of the small-flowering species. (G. C. n. s., iii. 657.) *M. crassicaudata* is a variety with short, stout tails.

M. polysticta (many-dotted), of Hooker. A synonym of *M. melanopus*.

M. porcelliceps (pig-snout). *fl.* yellowish, speckled with brown; petals white; lip covered with brown warts, rhomboid. 1883. A small but pretty species.

M. psittacina (parrot-like). *fl.* dull-coloured, small, solitary. Columbia, 1876.

M. pulvinaris (cushioned). *fl.* olive-green, with purplish tails and blotches; remarkable for the two cushions on the lower connate sepals. 1880.

M. radiosa (radiating). *fl.*, sepals light ochre-coloured on the internal upper part; the larger inner part looks blackish-purple, from being densely covered with blackish warts on a purplish ground; petals whitish, with a brown blotch at the base; lip white, with the upper surface of the radiating dissepiments reddish, and with a few fringes at the black apex. Columbia, 1877.

M. Reichenbachiana (Reichenbach's).* *fl.* 2in. long; the funnel-shaped tube and slender tails whitish-yellow, with the back part blood-red. *l.* spathulate, narrowed towards the base, tridentate at apex. Costa Rica, 1875. *aurantiaca* is a fine variety, with rich orange lateral sepals.

M. Roezlii (Roezl's).* *fl.*, sepals blackish india-purple, with darker warts, and having a few short light purple hairs on the edges; petals light mauve, with some dark-eyed blotches; lip also light mauve. Columbia, 1880. A handsome plant. (R. X. O. ii. 186.)

M. rosea (rosy). *fl.* rosy-purple, about 2in. long, solitary. Columbia, 1880. A handsome species. (G. C. n. s., xiii. 680.)

M. Schlimii (Schlim's).* *fl.* yellow, mottled with brownish-red spots; the combined body of the two lower sepals produced much beyond that of the upper one, and somewhat pandurate in outline; tails 1in. long; scape three to six-flowered, twice as long as the leaves. *l.* spathulate-elliptic, 6in. to 12in. long. Venezuela, 1884. A large and rather showy species. (B. M. 6740; G. C. n. s., xix. Fig. 80.)

M. severa (severe). *fl.* port-wine-brown or maroon, transversely barred with yellow; the asperities ending in short bristles. *l.* large, spathulate-oblong. Columbia, 1875. This plant is allied to *M. Chimæra*, *M. Roezlii*, and *M. Shuttleworthii*.

M. Shuttleworthii (Shuttleworth's).* *fl.* richly streaked with purple, green, and yellow; sepals spreading, with long tails. *h.* 4in. Columbia, 1874. A very pretty species. (B. M. 6372.) *xanthocorys* is a variety with a nearly yellow dorsal sepal, finely striped with brown lines.

M. simula (pug-nosed). *fl.* purplish, honey-coloured in front, small; upper sepal purplish, with pellucid bars. *l.* linear-lanceolate. New Grenada, 1875.

M. spectrum (spectre). *fl.* disposed in three-flowered racemes; sepals narrow, mottled with violaceous or blackish-purple dots, and having yellow tails as long as themselves. Columbia, 1875. Allied to *M. severa*.

M. splendida (splendid). *fl.*, tube rich scarlet, with a violet sheen, long and slender, with abrupt tails; petals white; lip white, with a violet disk, and a dark violet knob at the apex. Andes, 1875. A beautiful species, somewhat resembling *M. Veitchiana*.

Masdevallia—*continued.*

M. swertiæfolia (Swertia-leaved). *fl.* variously-coloured; at first ochre, with brown spots; afterwards purple, with the exception of the inner sides of the lateral sepals and their tails, which are yellow; peduncles one or several-flowered. *l.* resembling those of *Swertia perennis*. New Grenada, 1880. A curious plant.

M. torta (twisted). *fl.* light ochre, dotted and striped with purple, broad-cupped; tails yellow inside, the lateral ones twisted. *l.* cuneate-ligulate, acute, bidentate, on long petioles. 1883.

FIG. 521. LEAVES AND FLOWERS OF MASDEVALLIA TOVARENSIS.

M. tovarensis (Tovar).* *fl.* pure white, usually in pairs on a peduncle which springs from the base of, and is a little longer than, the leaves. Autumn and winter. *l.* somewhat spathulate, coriaceous, deep green, erect, about 6in. high. Tovar, Columbia, 1865. See Fig. 521. (B. M. 5505.)

M. triangularis (three-angled). *fl.*, sepals expanding widely, light ochre-colour, with innumerable light, elegant, brownish-purple spots: petals small, white: lip rhombic, white, spotted all over with purple spots; its opposite part shows two triangular side laciniæ and a cuneate-oblong, fringed, small, blackish-purple middle lacinia: these latter-mentioned parts are reflexed in a very elegant manner. Winter. *l.* cuneate-oblong. Venezuela, 1842.

M. triaristella (three-bristled).* *fl.* brown and yellow; lower sepals connate into a boat-shaped lip, with a long bristle on each side; upper sepal also ending in a bristle, 2in. from end of upper

Masdevallia—*continued.*

to end of lower sepal; petals whitish; peduncles one or two-flowered, minutely warted, 4in. to 5in. long. *l.* canaliculate, 1in. long, terete. Costa Rica, 1876. Very distinct. (B. M. 6268.)

M. trichæte (three-bristled). This much resembles *M. triglochin*, but has longer leaves and smaller flowers, the latter of a rich brown-purple, with orange tails, and some parts of the base orange, with brown nerves. *h.* 3in.

M. tridactylites (three-fingered). *fl.* small; dorsal sepal yellow; lateral ones brownish-purple; tails orange, sigmoid, blunt; peduncles very slender. *l.* very thin, semi-terete, acute, channelled.

M. triglochin (three-hooked).* *fl.* small but beautiful, borne, several in succession, on a peduncle not much longer than the leaves; sepals red, with yellow tails; petals pale yellow, blotched with red on the disk; lip pale, with some red on each side at base. *l.* light glaucous-green, spotted with violet beneath, 1½in. long, thick, narrow, spathulate-cuneate, acute. Ecuador, 1878. A very dwarf plant, of neat habit.

M. Trochilus (Trochilus). A synonym of *M. ephippium.*

M. troglodytes (Troglodyte). *fl.* whitish outside, inside and tails purple-brown, mottled on the margin with yellow, spotted on the sides and apex with red-brown; tails almost equal, 1½in. to 2in. long; perianth open, ¾in. in diameter; scape one-flowered. *l.* linear-lanceolate, tridentate at apex. Columbia, 1878. (B. H. 1877, 5.)

M. Tubeana (Tube's). *fl.*, sepals brownish-violet, with a yellow base and rather long tails; petals white, as are also the lip and column. *l.* soft, cuneate-oblong, acute, 1ft. long, petiolate. Ecuador, 1878.

M. urostachya (tail-spiked). *fl.* dark brown, with small orange markings, more numerous, longer-stalked, and smaller than in *M. Schlimii*, which this plant otherwise resembles. 1882.

M. Veitchiana (Veitch's).* *fl.* solitary; outer surface of the sepals tawny-yellow, the inner surface rich orange-scarlet; nearly the whole of this portion is densely set with short, erect, woolly glands, or papillæ, which are tipped with rich purple. Autumn and winter. *l.* about 8in. long, coriaceous, dark green. Peru, 1867. Probably the finest species yet introduced. (B. M. 5739.) *grandiflora* is a magnificent form, with very large flowers.

M. velutina (velvety). *fl.* rosy-violet and white, velvety within, as large as those of *M. Estradæ*, but with longer tails; peduncle slender, dark violet, one-flowered. *l.* ligulate, in dense tufts. *h.* 6in. Columbia, 1875.

M. vespertilio (bat-like). *fl.*, sepals pale yellow, blotched with brownish-purple, having numerous yellow bristles inside, and yellow tails longer than their body; petals brown and yellow, small; the lip is extended in a broad, transverse, keelless epichile, the small hypochile with a somewhat horseshoe-like, blunt, angular keel; column white. Columbia, 1877.

M. Wageneriana (Wagener's). *fl.* yellow, with a rhomboid toothleted lip. *l.* small, short-stalked, very thick. *h.* 4in. Central America. (B. M. 4921.)

M. Wallisii (Wallis's).* *fl.* yellow, spotted with blood-red, 8in. from tip to tip of the dorsal and lateral sepals; sepals hispid with soft, spreading hairs on the inner surface, suddenly contracted into slender red-purple tails, 3in. long; margins reflexed; petals very short, ½in. long; lip ¼in. long, spathulate. December. *l.* narrowly oblanceolate, acute, 6in. to 9in. long. New Grenada. This plant is usually cultivated under the name of *M. Chimæra*, and is figured as such in B. M. 6152. *discoidea* is a pretty variety, with a white disk at the apex of each sepal, and with a stronger beard.

M. Winniana (Winn's). This species is similar to *M. Roezlii*, but larger; the flowers are lighter in colour, with more gradually tapering sepals, and an erect peduncle. 1881.

M. xanthina (yellow). *fl.* bright yellow, dark violet at the very base of even sepals, which are a little narrower than the odd one; lip yellowish, with a knob at the apex. *l.* cuneate-oblong. 1880.

M. xanthodactyla (yellow-fingered). *fl.* greenish-white, with yellow tails; lip and column nicely mottled and marbled with dark brownish-violet. October. Tropical America, 1877.

MASSANGEA (named after M. Massange de Louvrex, a distinguished Belgian horticulturist). ORD. *Bromeliaceæ.* A small genus of stove herbaceous perennials, now included, by Bentham and Hooker, under *Caraguata.*

Massangea—*continued.*

They are grown principally on account of the elegance of their leaves. For culture, *see* **Billbergia.**

FIG. 522. MASSANGEA HIEROGLYPHICA.

M. hieroglyphica (hieroglyphic).* *l.* dark green, banded with violet-black, and having hieroglyphic markings. Brazil, 1878. See Fig. 522. (R. H. 1878, 175.)

M. Lindeni (Linden's). *l.* ligulate-oblong, abruptly acuminate, greyish, marked with transverse, narrow, wavy bars of violet-brown. Peru, 1878. (I. H. 1878, 309.)

M. musaica (mosaic).* *fl.* in terminal close heads on an erect scape, provided with scarlet bracts; corolla snow-white; calyx brownish, ivory-white at the apex. Spring. *l.* ligulate, recurved at the apex, 1ft. long, 2in. broad, yellowish-green, marked irregularly with patches of dark green, which present a mosaic appearance. *h.* 1ft. Columbia, 1873. SYNS. *Tillandsia musaica* and *Vriesia musaica.* (B. H. 1877, 8, 9.)

MASSONIA (named after F. Masson, 1741-1805, a botanical traveller in South Africa). SYN. *Podocallis.* ORD. *Liliaceæ.* A genus comprising, according to Mr. Baker, about twenty-five species of small-growing, greenhouse, bulbous plants, natives of South Africa. Flowers white, in an umbel-like head, nearly sessile between the leaves, and surrounded by a many-leaved scarious involucre; perianth with a cylindrical erect tube, and a six-cleft, spreading or reflexed limb; scape short or none. Leaves radical, twin, nearly opposite, spreading, ovate or rarely oblong. The species are more curious than beautiful. They thrive in sandy peat, and, as is the case with most South African bulbous plants, like a decided season of rest.

M. angustifolia (narrow-leaved). *fl.*, perianth white; segments linear, reflexed, half as long as the tube; corymbs shortly pedunculate, six to twenty-flowered. April. *l.* lanceolate, ascendent, acute, 3in. to 4in. long, 1in. broad. 1775. (B. M. 756.)

M. candida (white). *fl.*, perianth white, nearly 1in. long; segments linear-lanceolate, reflexed; corymbs twenty to thirty-flowered. April. *l.* round, smooth, obtuse, fleshy-herbaceous, 3in. to 6in. long and broad. *h.* 6in. (B. R. 694.)

M. ensifolia (sword-shape-leaved). *fl.*, perianth lilac, ¾in. to 1in. long; segments linear-ligulate, spreading; corymbs three to twelve-flowered. April. *l.* fleshy-herbaceous, lanceolate, 2in. to 4in. long, 1in. to 1¼in. broad. *h.* 6in. 1790. (B. M. 554; A. B. R. 46, under name of *M. violacea.*)

M. latifolia (broad-leaved). A synonym of *M. sanguinea.*

M. muricata (muricated). *fl.*, perianth white, 1in. long; segments lanceolate, reflexed, about half as long as the tube. April. *l.* fleshy-herbaceous, round-cordate, 3in. to 4in. long and broad. *h.* 6in. 1790. (B. M. 559.)

M. pustulata (blistered). *fl.*, perianth 1in. long; segments linear-lanceolate, reflexed, half the length of the tube; filaments white; corymbs ten to twenty-flowered. February. *l.* ovate-

Massonia—*continued.*

rotundate, fleshy-herbaceous, smooth, sub-acute, 5in. to 6in. long, 3in. to 4in. broad. *h.* 3in. 1790. SYN. *M. scabra.* (B. M. 642.)

M. sanguinea (bloody). *fl.*, perianth white, nearly 1in. long; segments linear-lanceolate; filaments suffused with red; corymbs fifteen to twenty-flowered. March. *l.* fleshy-herbaceous, almost rotundate-cordate, acute, 4in. to 6in. long, 3in. to 4in. broad. *h.* 6in. 1775. SYN. *M. latifolia* (under which name it is figured in B. M. 848).

M. scabra (scabrous). A synonym of *M. pustulata.*

M. violacea (violet). A synonym of *M. ensifolia.*

MAST. The fruit of *Fagus sylvatica.*

MASTACANTHUS SINENSIS. A synonym of **Caryopteris Mastacanthus** (which *see*).

MASTWORTS. Lindley's name for *Corylaceæ.*

MATAXA. A synonym of **Lasiospermum** (which *see*).

MATHIOLA (named after Peter Andrew Mathioli, 1500-1577, an Italian physician and celebrated botanist). Stock. ORD. *Cruciferæ.* A genus of about thirty species of hardy, half-hardy, or greenhouse, annual, biennial, or perennial, stellato-tomentose herbs or sub-shrubs, natives of Western and Southern Europe, Western Asia, and (one) South Africa. Flowers often purple, large, racemose, generally sweet-scented; petals with long claws; stigmas connivent, thickened or horned at the back. Seeds thin, flat, numerous; pods large, nearly cylindrical, or compressed. Leaves oblong or linear, entire or sinuate. Mathiolas are well-known plants, largely cultivated in

FIG. 523. MATHIOLA INCANA FLORE-PLENO.

almost every garden, under the popular name of Stocks. There are several sections, and numerous varieties; the flowers represent a great diversity of colour, and are invariably highly perfumed, and of great beauty. Plants may readily be raised from seed, sown in succession on a slight hotbed, from February till April, and the seedlings transplanted, when large enough, to the open ground where they are intended to flower. The Brompton and Intermediate sections should be sown in August and September, and the plants preserved in pots, in a cold frame, throughout the winter, in preparation for flowering early, outside, the following season. Varieties of *Mathiola* are very extensively cultivated in pots, for greenhouse and other decorations. For general culture of all the sections, *see* **Stocks.**

M. annua (annual).* Ten-Weeks Stock. *fl.* of various colours, pure and variegated, varying from single to double. May to October. Pods somewhat cylindrical, without glands. *l.* lanceolate, blunt, hoary. Stem herbaceous, erect, branched. *h.* 1ft. to 2ft. South Europe. 1731. Hardy annual. The Intermediate Stock belongs to this species.

M. bicornis (two-horned).* *fl.* purplish-red, like those of *M. incana*, but smaller, sub-sessile; petals oblong-spathulate. Spring. Pods long, terete, cornicles. *l.* oblong-lanceolate, pinnatifid; upper ones entire. Stem branched. Greece. Half-hardy sub-shrub.

M. fenestralis (fenestrate). *fl.* scarlet or pale purple, a little smaller than those of *M. incana.* July and August. Pods pubescent, without glands, broadest at the base. *l.* crowded, obovate,

Mathiola—*continued.*

downy, revolute. Stem erect, simple. *h.* 1ft. Crete, 1759. Hardy sub-shrub.

M. incana (hoary).* Wallflower-leaved Stock. *fl.* usually purple. Summer and autumn. Pods somewhat compressed, without glands. *l.* lanceolate, hoary. Stem shrubby at the base, erect, simple or branched. *h.* 1ft. to 2ft. South Europe. Half-hardy sub-shrubby biennial. From this species, the Brompton and Queen Stocks have originated, and these are said to be distinguished by the under portion of the leaf of the latter being rough and woolly, whilst the leaf of the former is smooth on both surfaces. *flore-pleno* is a double-flowered form. See Fig. 523.

M. odoratissima (very sweet-scented). *fl.* dirty cream-colour, or when old purplish-brown, sweet-scented in the evening. June and July. Pod compressed, somewhat hoary. *l.* downy or pubescent, toothed or pinnatifid. Stem erect, branched. *h.* 1ft. to 2ft. Persia, 1795. Greenhouse evergreen sub-shrub. (B. M. 1711.

FIG. 524. FLOWERING BRANCH OF MATHIOLA TRICUSPIDATA.

M. tricuspidata (three-pointed). *fl.* bright lilac (lighter-coloured towards the base of each petal), in terminal, flexuose, many-flowered racemes. Summer. *l.*, root ones oblong, obtuse, repandly dentate or slightly sinuate; cauline ones more divided, sinuately pinnatifid. *h.* 1ft. Mediterranean region. Hardy annual. See Fig. 524. (S. B. F. G. 46.)

MATONIA (named after Dr. Maton, Vice-president of the Linnæan Society). ORD. *Filices.* A monotypic genus. The species is a rare and handsome stove fern. For culture, *see* **Ferns.**

FIG. 525. MATRICARIA INODORA FLORE-PLENO, showing Habit and detached Flowering Branchlet.

Matonia—*continued.*

M. pectinata (comb-like). *fronds* ample, fan-shaped, 1½ft. to 2ft. wide, hard-coriaceous, each portion sub-scorpioideo-pinnate on the upper side, pinnules consequently all secund pectinato-pinnatifid. Receptacle of the *sori* expanded into a firm, membranaceous, umbrella-shaped, obscurely six-lobed, stipitate involucre, which covers and incloses six large sessile capsules. Borneo, &c., 1839.

MATRICARIA (so called from its former use in uterine affections). ORD. *Compositæ*. A genus of about seventy species of annual, rarely perennial, branched herbs, natives of Europe, North and South Africa, and West Asia. Flower-heads yellow, with the ray white or absent; involucral bracts in few series, nearly equal; receptacle broad, flat or conical, elongate after flowering, naked. Leaves much-divided, with narrowed lobes. Few of the species are worthy of cultivation; the annuals are readily raised from seeds, and the perennials by divisions of the roots, or by cuttings.

M. inodora flore-pleno (double-flowered, inodorous).* *fl.-heads* white. A double form of a native weed, a very floriferous and pretty border plant. See Fig. 525. In some gardens, it is met with under the name of *Anthemis Chamomilla flore-pleno*.

MATTOCK, or **PLANTER'S MATTOCK**. A garden implement, about the size and shape of an ordinary pick, but differing from that tool in having only one end pointed, the other being flattened in a transverse direction to the handle, like that of a grubbing axe. It is very useful for penetrating and breaking up hard masses of earth, &c.

MAURANDYA (named after Dr. Maurandy, once Professor of Botany at Carthagena). Including *Lophospermum* and *Usteria*. ORD. *Scrophularineæ*. A small genus (six species) of greenhouse, glabrous or pubescent herbs, confined to Mexico. Flowers violet, purple, or rose, showy; pedicels axillary, ebracteate; calyx five-parted; corolla tube spurred at base; lip spreading. Leaves alternate, or the lower ones opposite, hastate, angularly lobed or thickly toothed. *M. Barclayana* is

FIG. 526. PORTION OF FLOWERING STEM AND DETACHED FLOWER OF MAURANDYA BARCLAYANA.

one of the best-known species; it should be treated as an annual, for summer flowering outside. *M. erubescens* and *M. scandens* are well suited for a trellis or dwarf wall, outside, in a warm situation. All the species succeed in any moderately rich sandy loam. Propagated by seeds, which should be sown, in early spring, on a slight hotbed, and the seedlings grown on prior to being planted in greenhouses, or warm positions outside, in May or June; also by cuttings of young shoots, inserted, in August, under a shaded hand glass.

M. atrosanguineum (dark bloody). *fl.* dark purple; corolla funnel-shaped, clothed with white glandular hairs; throat cylindrical. Summer. *l.* cordate, acuminated, coarsely and dentately serrated. 1832. Plant clothed with shining, jointed hairs. (B. R. 1755.)

Maurandya—*continued.*

M. Barclayana (Barclay's).* *fl.*, corolla 1½in. to 2in. long; tube downy, greenish, curved; lobes ovate-roundish, emarginate, of a violet-purple colour. Summer. *l.* cordate, acuminated; young ones somewhat hastate; lower and middle ones obscurely five-lobed. 1825. See Fig. 526. (B. R. 1108; L. B. C. 1381.)

M. erubescens (blushing). *fl.* large, rose-coloured, beset with capitate hairs; tube whitish beneath, marbled in various ways inside. Summer and autumn. *l.* cordate, five-lobed, downy; lobes mucronate, crenated, or deeply serrated. Branches clothed with articulated, short, viscid hairs. 1830. (B. v. 242; B. M. 3037, 3033; B. R. 1381, under name of *Lophospermum erubescens*.)

M. Hendersoni (Henderson's). Probably a variety of *M. scandens*.

FIG. 527. FLOWERING BRANCH AND DETACHED FLOWER AND LEAF OF MAURANDYA SCANDENS.

M. scandens (climbing).* *fl.* purplish-violet, glabrous. Summer. *l.* cordate, acuminated, deeply serrated, hairy. 1834. See Fig. 527. SYNS. *Lophospermum scandens* (B. i. 17; B. M. 3650; S. B. F. G. ser. ii. 401) and *Usteria scandens* (A. B. R. 63). *M. Hendersoni*, with violet-purple flowers, striped or spotted with white, is probably a variety of this species.

M. semperflorens (ever-flowering). *fl.*, corolla pale violet or reddish, 1½in. long, with emarginate lobes; tube variously furrowed; filaments rather villous at base; calyx segments lanceolate-subulate, glabrous. *l.* mostly cordate-hastate. 1796. (B. M. 460.)

MAURIA (named after Ernesto Mauri, an Italian botanist, 1791-1836). ORD. *Anacardiaceæ*. A genus comprising ten species of stove evergreen trees, inhabiting tropical America. They have axillary and terminal panicles of hermaphrodite or polygamous flowers, and alternate, simple or impari-pinnate leaves. The two species once cultivated in this country, *M. heterophylla* and *M. simplicifolia*, are probably now lost to British gardens.

MAURITIA (named after Prince Maurice, of Nassau, 1567-1665, a supporter of natural history). Including *Orophoma*. ORD. *Palmeæ*. A genus comprising six or seven species of handsome, large-growing, unarmed, stove palms, natives of Northern Brazil, Guiana, and the West Indies. Flower-spikes pendulous, produced from amongst the leaves, often very large, and bearing the flowers in numerous catkins, which are sheathed at the base. Fruit large, clothed with hard scales, overlapping, like a coat of mail. Leaves in a large crown, fan-shaped. Mauritias thrive best in a compost of loam and peat; and the pots should, if possible, be placed in tanks of water. Propagated by seeds, sown in a hotbed, in spring.

M. aculeata (prickly). *l.* flabelliform-pinnatifid; pinnæ lanceolate-linear, spinulosely ciliated, densely glaucous beneath. Caudex spiny. Tropical America. A curious and handsome species.

M. flexuosa (flexuous). *l.* flabelliform-pinnatifid, dark green on both surfaces; petioles semi-terete, channelled. Caudex unarmed. Tropical America, 1816. A handsome plant.

MAXILLARIA (from *maxillæ*, the jaws of an insect; referring to a resemblance in the column and lip). ORD. *Orchideæ*. An extensive genus of stove terrestrial

Maxillaria—*continued.*

orchids. Over 100 have been enumerated as species, but some of these are merely garden forms; they are natives of tropical America, extending from Brazil as far as the West Indies and Mexico. Flowers more or less ringent; lateral sepals adhering to the column at their oblique base; lip hooded, jointed with the prolonged claw-like foot of the column, which is narrow, ascending; pollen masses four; scapes or peduncles at base of pseudo-bulbs, or in the axils of the leaves, solitary, always one-flowered. Leaves coriaceous, slender, or rather fleshy. A large number of species and varieties are described, but, as the majority of them produce small flowers, the whole genus has fallen out of favour with most orchid-growers. There are, however, some which should find a place in every collection, however limited the space. From a cultural point of view, few plants of this order are easier to grow than those now under consideration. Maxillarias thrive best when treated as pot plants, and should be potted in a compost of good fibrous peat and chopped sphagnum, in about equal parts. During the growing season, a temperature of 60deg. to 70deg., and an abundant supply of water, are essential to their well-being; in the winter, less water must be given, and the temperature should fall some 10deg. or 12deg. lower than during the period of growth. It is not, however, advisable to thoroughly dry off during winter. Propagated by divisions of the pseudo-bulbs, in spring.

M. acicularis (needle-leaved). *fl.* dark blood or chocolate-coloured, erect; sepals and petals oblique or sub-ovate-spathulate; petals paler, and decurrent with the white column; lip obscurely three-lobed. *l.* setaceo-fusiform, 3in. to 4in. long. Pseudo-bulbs in clusters. Brazil. (B. M. 4374.)

M. acutipetala (sharp-petaled). *fl.* pale orange, spotted and blotched with blood-colour; sepals oblong, acute, 1½in. long; petals smaller; lip articulated on the base of the decurrent column, paler below. March and April. *l.* two, from the summit of the pseudo-bulb, linear-oblong or almost ligulate. Pseudo-bulbs deeply furrowed. Central America. A very desirable orchid. (B. M. 3966.)

M. arachnites (cobwebby). *fl.* yellowish; acuminate segments bent and twisted; lip ochre, bordered with purple, and with many short streaks and lines. Columbia, 1880.

M. aromatica (aromatic). A synonym of *Lycaste aromatica.*

M. ciliata (ciliate). A synonym of *Lycaste Barringtoniæ.*

M. cruenta (bloody). A synonym of *Lycaste cruenta.*

M. cucullata (hooded). *fl.* greenish-chocolate; sepals oblong-lanceolate, acute, spreading; petals similar, but smaller, connivent over the column; lip jointed at the base of the column, recurved; scapes radical, about 4in. long. September. *l.* solitary, linear-oblong. Pseudo-bulbs surrounded by jagged membranes. Tropical America. (B. M. 3945.)

FIG. 528. FLOWER OF MAXILLARIA PICTA.

M. Deppei (Deppe's). A synonym of *Lycaste Deppei.*

M. fractiflexa (twisted). *fl.*, sepals and petals drawn out into long curved and twisted tails, 6in. or more in length, the tails and basal parts purple; disk white; lip white and red. 1881. A distinct species.

Maxillaria—*continued.*

M. grandiflora (large-flowered).* *fl.* snow-white, large; sepals from 1½in. to 2in. long, and from ¾in. to 1in. broad, not acuminate; petals smaller; lip three-lobed, streaked with yellow on the lateral lobes, and blotched with crimson inside, central or intermediate portion lemon-yellow; scape one-flowered, 4in. to 9in. high. Pseudo-bulbs ovate, with sharp edges, dark green, 2in. high, and one-leaved. Paraguayan Andes and Peru. (I. H. 14.)

FIG. 529. PSEUDO-BULB, LEAF, AND FLOWER OF MAXILLARIA VENUSTA.

M. Henchmanni (Henchmann's). A synonym of *M. variabilis.*

M. irrorata (bedewed). *fl.* white, bordered, blotched, and washed with purple, about 1in. long; lip ochre, with a purple margin and two purple spots beneath; peduncle covered with broad sheaths. Andes, 1883.

M. leptosepala (narrow-sepaled). *fl.* large, solitary; sepals yellowish-white, very spreading, 2½in. long; petals similar, but smaller; lip oblong obovate, three-lobed, with a swelling at the base of the disk; scapes two or three from the base of the pseudo-bulbs. July. *l.* solitary, nearly 1ft. long. Pseudo-bulbs clustered, about 2in. long. *h.* 1ft. New Grenada, 1846. (B. M. 4434.)

M. luteo-alba (yellowish-white).* *fl.* creamy-white, large, proceeding from the sides of the bulbs at different times of the year. *l.* long and broad, about 1½ft. in height. Merida. A neat-growing species. (W. O. A. 106.)

M. luteo-grandiflora (large-flowered yellow).* *fl.*, sepals and petals broad, creamy-white towards the base, of a tawny-orange upwards, suffused with brownish-crimson; lip creamy-white; scapes about half the length of the leaves. Winter and spring. A very handsome garden plant, forming a compact mass, and flowering very freely. (F. M. 559.)

Maxillaria—*continued.*

M. nigrescens (dark). *fl.*, sepals and petals port-wine colour, spreading; lip of the same colour, stained with dull purple; peduncles erect. Winter and spring. Pseudo-bulbs light green, bearing a solitary, dark green, coriaceous leaf. New Grenada.

M. Parkeri (Parker's). *fl.* buff, white; sepals oblong, obtuse; petals linear-lanceolate; lip trilobed, hooded. April. *l.* lanceolate, coriaceous, obscurely striate. Pseudo-bulbs oval, compressed, one-leaved. *h.* 9in. Demerara, 1826. (B. M. 2729.)

M. picta (painted). *fl.* of a soft cream-colour, more or less streaked and dotted with dull purple and chocolate, both within and without, yielding a most powerful aromatic perfume; petals remarkably incurved; scapes from 5in. to 6in. high. Winter. *l.* thick, strap-shaped, nearly 1ft. long. Brazil. Not a very showy species, but a profuse blossomer, and admirably suited for growing in a Wardian case. See Fig. 528. (B. M. 3154.)

M. porphyrostele (purple-columned). *fl.* whitish-yellow; petals with a purplish streak at the base; lip with purplish veins on the side lobes. Spring. *l.* linear-ligulate, from small ovoid pseudo-bulbs. *h.* 6in. Brazil, 1873. This species somewhat resembles *M. picta*. (B. M. 6477.)

M. rufescens (reddish). *fl.* orange and yellow, spotted with dark purple-red, sweet-scented. Trinidad, 1836. (B. R. 1848.)

M. splendens (splendid).* *fl.*, sepals and petals white; lip orange, margined with rose. Columbia, 1870. A very handsome species, similar in growth to *M. venusta*, but more robust.

M. tenuifolia (slender-leaved). *fl.* yellow, with bright crimson barrings, proceeding from the base of the matured growths. March. *l.* long-linear, acuminate. Pseudo-bulbs ovate, like so many bulbils strung together on short perpendicular footstalks. (B. R. xxv. 8.)

M. tetragona (tetragonal). A synonym of *Lycaste tetragona*.

M. Turneri (Turner's). *fl.* of a rich cinnamon-brown and crimson, with a delicious fragrance. May. *l.* long, broad, 1ft. high. Pseudo-bulbs short. A distinct and desirable plant.

M. variabilis (variable).* *fl.* purplish; sepals and petals erect, oblong-acute; lip oblong, erect, obscurely three-lobed; peduncles longer than the pseudo-bulbs. *l.* solitary, linear-ligulate. Mexico. (B. M. 3614, under name of *M. Henchmanni*.)

M. venusta (handsome).* *fl.* of a very beautiful waxy-white, thick and fleshy in texture; lip faintly stained with yellow and blotched with crimson; scapes long. November to February. *l.* light shining green, linear-oblong. Pseudo-bulbs two-leaved. New Grenada, 1862. A beautiful species, very easy to grow, and remaining in flower a long time. See Fig. 529. (B. M. 5296.)

MAXIMILIANA (named after Maximilian I., King of Bavaria). ORD. *Palmeæ*. A small genus (three species) of elegant stove palms, inhabiting the Amazons and Maranon, and the island of St. Kitts and Trinidad. Flower-spikes each inclosed in a thick woody spathe, which tapers to a long point, deeply furrowed, splitting open at last down one side. Leaves very large, pinnate, borne at the summit of the trunks; leaflets narrow, arranged in clusters along the stalks. Trunks slender, smooth. This genus is closely allied to **Cocos** (which *see* for culture).

M. caribea (Caribbean). *l.* large; segments pale green, reduplicate, obliquely inserted at the double base, densely veiny with transverse veins. This species is similar in habit to *M. Martiana*, but the leaf segments are broader, and a little tapering towards the eroded point. St. Kitts.

M. Martiana (Martius'). *l.* pinnate; leaflets linear, acuminate, pendent, dark green, about 2ft. long. Caudex erect, cylindrical, unarmed. South America, 1825. A handsome decorative plant when in a young state. SYN. *M. regia*.

M. regia (royal). A synonym of *M. Martiana*.

MAXIMOWICZIA. Included under **Schizandra** (which *see*).

MAY. A name applied to the blossoms of *Cratægus Oxyacantha*.

MAYACEÆ. A natural order, comprising a solitary genus, *Mayaca*, of moss-like, slender, creeping, pellucid plants, all natives of America, allied to *Xyridaceæ* and *Commelinaceæ*, but readily distinguished by their one-celled anthers. Flowers white, pink, or violet, axillary, solitary, peduncled. Leaves all alternate, crowded, linear, emarginate, flaccid. There are about seven species.

MAY APPLE. *See* **Podophyllum peltatum.**

MAY BUGS. A name sometimes given to certain beetles which are destructive, in the larval form, to the roots of numerous plants, including many that are cultivated in fields and in gardens. The perfect insects also are very destructive, often stripping the leaves almost entirely from trees, especially from Oaks, low fruit-trees, and Rose bushes.

The most successful methods for limiting the number of these insects are, hand-picking, or shaking them off the shrubs or bushes into vessels in the very early morning, or collecting the grubs, when these are exposed by digging or ploughing the soil. In either case, the insects found should be at once destroyed. Birds also render good assistance in this direction by the number that they eat, either as beetles or as larvæ. Among the birds most useful in this way, starlings and rooks deserve special mention. Other remedies will be found under **Cockchafer** and **Insecticides** (which *see*). There are several kinds of beetles indigenous to England included under the name of May Bugs; of these, the more

FIG. 530. MELOLONTHA VULGARIS (Cockchafer), Female and Male.

important are the Cockchafer (*Melolontha vulgaris*, see Fig. 530) and the Lesser May Bug (*Phyllopertha horticola*).

The Cockchafer has been already noticed in this work. It is very abundant in the South of England, but becomes local and scarce in Scotland. It may be added here, that, in the Cockchafer, the wing-cases and legs are yellowish-brown, with a dash of red, but are covered with short, fine, grey hairs, which are very readily rubbed off. The rest of the upper surface is mostly pitch-black, with paler pubescence. The antennæ, or feelers, are rusty-red. The lower surface of the body is black, with paler pubescence, and five conspicuous white triangular spots on the sides of the segments of the abdomen.

The Lesser May Bug is nearly as abundant as its larger ally in the South of Britain, and in the North is far more common than that insect. It is much smaller, being only $\frac{1}{3}$in. to $\frac{2}{3}$in. long, and the club of the antennæ is composed of only three, instead of six or seven, flattened joints. In colour of wing-cases, and in form, it is much like the Cockchafer, but the tip of the body is not prolonged as in that species. Occasionally, the wing-cases are brown or green-black. The rest of the body is shining green or blue-black, with long, erect, paler hairs on certain parts. The beetles at times do considerable damage to Roses and to fruit-trees, by feeding on the stamens and petals of the flowers. They may, however, in dull weather, be successfully shaken off the bushes into an inverted umbrella, and should be collected and destroyed when so numerous as to become troublesome. The larvæ resemble those of the Cockchafer, except in size. They feed on the roots of many garden plants, and also on those of the Fir; and they are often present in flower-pots, the plants in which they frequently destroy, causing them to fade early. At times, they are very troublesome. The methods recommended for the destruction of the larvæ of the Cockchafer will be found useful against this species also. If a pot plant becomes sickly without visible cause, it should be turned out, with the earth attached to the roots, and there will then often be found one or more of the larvæ of the Lesser May Bug feeding on it.

MAYFLOWER. A New England name for **Epigæa repens** (which *see*).

MAYTENUS (from *Mayten*, the Chilian name of the genus). SYN. *Hænkea*. ORD. *Celastrineæ*. A genus comprising about fifty species of unarmed, greenhouse or half-hardy, evergreen shrubs or small trees, natives of the tropical, sub-tropical, and temperate Southern regions of America. Flowers white, yellow, or reddish, small, axillary, solitary or fasciculate, or cymose. Capsule coriaceous, one to three-celled. Leaves alternate, often distichous, petiolate, coriaceous, serrated. The wood of the arborescent species is extremely hard, and the leaves of the Peruvian kinds are much liked by cattle. The species are not largely grown in this country. For culture, *see* **Celastrus.**

M. Boaria (Boaria). *fl.* white, scattered. *l.* opposite or alternate, oblong, smooth, serrated. *h.* 10ft. Chili, 1822. Greenhouse shrub.

M. chilensis (Chilian). *fl.* greenish-yellow. May. *l.* elliptic-oblong, tapering to the base, taper-pointed, with serrated edges. Chili, 1829. Half-hardy tree or shrub. (B. R. 1702.)

MAZUS (from *mazos*, a teat; tubercles closing the mouth of corolla). SYN. *Hornemannia*. ORD. *Scrophularineæ*. A small genus (four species) of low, hairy or glabrous, herbaceous plants, inhabiting India, Eastern Asia, the Malayan Archipelago, and Australia. Corollas pale bluish or white; pedicels alternate; racemes terminal, sub-secund. Lower leaves and those of the young shoots opposite, those of the floral branches commonly alternate, inciso-crenate or thickly toothed. The undermentioned species is the best. It is an interesting, distinct, and pretty perennial, with a vigorous habit, rapidly forming dense tufts, scarcely 3in. in height. It thrives in pots or cold frames, or in the open air, and is best placed in firm, open, bare spots on rockwork, in free, sandy soil, in warm positions. Propagated by divisions.

M. pumilio (dwarf).* *fl.* pale violet, borne on very short stems. Early summer. *l.* spathulate, slightly waved at the edges. Australia, &c., 1823.

MEADIA. A synonym of **Dodecatheon** (which *see*).

MEADOW PINK. A common name of *Dianthus deltoides*.

MEADOW RUE. *See* **Thalictrum.**

MEADOW SAFFRON. *See* **Colchicum.**

MEADOW SWEET. *See* **Spiræa Ulmaria.**

MEALY BUG (*Coccus adonidum*). This well-known insect pest to cultivated plants belongs to the order *Homoptera*, and is very nearly allied to the equally hurtful Scale insects, and the Aphides, or Greenflies. From the latter class it differs in its broader and more flattened form, in having two filaments at the end of the abdomen, in never having honey-tubes, and in the males having only two wings. Scale and Mealy Bug are really group names, that include several kinds under each; and, together, they form the family *Coccidæ*, the males of which are minute, and of the structure described above, having no beak with which to feed. The females are usually very much larger than the males, are wingless, and have a beak. In the Scale insects, the female, after a time, becomes quite inert, and dies, attached to some branch, and covered over with a shield-like coat on the back. In the Mealy Bug, the female remains able to move during life; and her body is covered, not with a shield-like skin, but with cottony tufts of a white substance, the rings of the body remaining quite distinct when the coating is removed. The substance is secreted in the form of a sticky fluid, which, on the death of the insect, assumes the cottony appearance. With this substance the female covers up her eggs.

A number of kinds of *Coccus* have been described; but the commonest and most injurious in glass houses is *C. adonidum*. This insect attacks almost all greenhouse

Mealy Bug—*continued.*

and stove plants, Vines, &c., but is partial to *Dracæna* and its allies, asclepiads, and the members of certain other orders. The male is small, of a pale red colour, covered with a white bloom. It has white wings, the front margin of which is spotted with red; the tail filaments are white, and the antennæ moderately long. The female is oblong, wingless, red, but covered with white powder, and has the antennæ shorter than in the male. She can move freely till the time of laying her eggs has arrived, when her body remains, as a shield for her eggs, under the cottony substance previously referred to.

Numerous remedies against Mealy Bug have been proposed. Probably, the best are washing and scrubbing the branches and diseased leaves with a wash containing soft soap or infusion of tobacco. Spirits of wine (35 p.c.), applied with a small brush, is said to destroy the insects without injuring the plants. Gishurst's Compound, oils, and Vine dressings, have also been recommended as applications to woody parts, such as branches. All of these are useful insecticides, but are liable to injure the green parts of plants. Smoking, as practised for Aphides, does not materially injure the Mealy Bug's eggs, so that it should be repeated in a few days. Where a greenhouse is much infested, it should be thoroughly cleaned out, and all but the more choice plants should be destroyed. *See also* **Insecticides.**

MEASURES. As Measures in use for the sale of garden produce vary so much in different parts of the country, it will be impracticable to refer to them all here in a few general remarks. Baskets for fruit and vegetables are of various sizes and shapes, according to the several purposes for which they are required. The appended list includes most of the different Measures in use for the London markets. Being frequently made of very thin deal strips, which are more or less flexible, they vary a little in size. Especially is this the case with punnets, so largely used in London for holding nearly all kinds of fruit and salading, in small quantities, for sale. Grapes are put up in 2lb. and 4lb. punnets; new potatoes in 2lb. punnets. Apples and pears are put up in bushels, sieves, or half-sieves. Weights are always 16oz. to the pound.

Bunch. This term is used in speaking of herbs, &c. The size varies according to the season. A bunch of turnips consists of twenty to twenty-five; of carrots, thirty-six to forty; of greens, as many as can be tied together by the roots.

Bundle. A bundle of broccoli, celery, &c., contains six to twenty heads; seakale, twelve to eighteen heads; rhubarb, twenty to thirty stems, according to size; and of asparagus, from 100 to 125.

Bushel Basket. When heaped, a bushel basket ought to contain 1 imperial bushel. Diameter at bottom, 10in.; at top, 14½in.; depth, 17in. Walnuts, nuts, apples, and potatoes are sold by this measure. A bushel of the last-named, cleansed, weighs 56lb., but 4lb. additional is allowed if they are not washed. A junk contains two-thirds of a bushel.

Bushel Sieve. There are 10½ imperial gallons to a bushel sieve. Diameter at top, 17¾in.; at bottom, 17in.; depth, 11¼in.

Hand. A bunch of radishes, which contains from twelve to thirty, or more, according to the season.

Mushroom Punnets. These measure 7in. by 1in.

Pottle. A long, tapering basket, that holds rather over 1½ pints. A pottle of strawberries should hold ½ gallon, but never holds more than 1 quart. A pottle of mushrooms should weigh 1lb. A pottle of potatoes, = ¼ peck, should weigh 3½lb.

Radish Punnets. If to hold six hands, 8in. diameter by 1in. deep or for twelve hands, 9in. by 1in.

Salading Punnets. The size of these is 5in. by 2in.

Seakale Punnets. Diameter at the top, 8in.; at the bottom, 7½in. depth, 2in.

Sieve. This contains 7 imperial gallons. Diameter, 15in.; depth, 8in. A sieve of peas is equal to 1 bushel; a sieve of currants, 20 quarts. A half-sieve contains 3½ imperial gallons. It averages 12½in. in diameter, and 6in. in depth.

Land Measures. In measuring the surface of land of considerable extent, what is known as Gunter's Chain is commonly employed by surveyors. It consists of 100 links, each measuring 7·92in. in length. The total length is, therefore, 66ft. = 22yds. = 4 poles. This Measure is

Measures—*continued.*

indispensable for ascertaining the area of large spaces or the length of walks, roads, &c. Measuring-rods are always useful in gardens, for fixing the necessary distances, when planting various crops. Without measurements of some sort, no regularity in cropping could be insured. A 10ft. rod is a handy length. It should be 1¼in. square, and be marked every 3in. on two opposite surfaces, the numbers of the feet reading from either end.

MECONOPSIS (from *Mekon*, a Poppy, and *opsis*, resemblance; alluding to the general appearance of the plant). ORD. *Papaveraceæ*. A genus comprising eight species of showy, hardy, perennial, biennial, or rarely annual herbs, of which one is found in Western Europe (Britain), one in North-west America, and the rest in the Himalayas. Flowers yellow, purple, or blue, large, showy, on long peduncles, nodding when in the bud; petals four; sepals two. Leaves entire, or often lobed or dissected. The species are of easy culture in any moderately good garden soil. Seeds of the Indian species should be sown, during March, in a gentle hotbed, and the seedlings transferred, when large enough to handle, to the open border.

M. aculeata (prickly). *fl.* purple, with numerous yellow stamens, about 2in. across. *l.* cordate in outline, somewhat five-lobed, covered with rigid, hair-like prickles. *h.* 2ft. North-west India, 1864. Biennial. (B. M. 5456.)

M. cambrica (Welsh).* Welsh Poppy. *fl.* pale yellow, erect, on long peduncles. May to August. *l.* numerous on the lower part of the stem, pinnate, stalked; lobes toothed, somewhat decurrent. *h.* 1ft. Western Europe (Britain). A very showy and desirable perennial; it thrives well on rockwork. (Sy. En. B. 63.)

M. nepalensis (Nepaulese).* *fl.* pale golden-yellow, nodding, from 2in. to 3½in. across. Flower stems from 3ft. to 5ft. high, not much branched. Himalayas, 1866. A handsome free-flowering biennial. (B. M. 5585.)

M. simplicifolia (simple-leaved). *fl.* violet-purple, solitary and terminal, from 2in. to 3in. across. June. *l.* tufted, lanceolate, slightly toothed, covered with a short, dense, brownish pubescence. *h.* 3ft. Nepaul, 1855. Biennial. (I. H. 114.)

M. Wallichi (Wallich's).* *fl.* pale blue, drooping on the slender branches, somewhat evanescent. June. *l.* pinnatifid, hispid, sometimes 1ft. long. *h.* 4ft. to 6ft. Sikkim Himalayas. A very handsome perennial. (B. M. 4668.)

M. W. fusco-purpurea (brownish-purple). A very effective and ornamental variety, having brownish-purple flowers arranged in a loose panicle, 2in. to 3in. in diameter. (B. M. 6760.)

MECOSORUS. Included under *Gleichenia*.

MEDEOLA (name of mythological origin, after the sorceress Medea; from the wholly imaginary notion that the species possesses great medicinal virtues). SYN. *Gyromia*. ORD. *Liliaceæ*. A monotypic genus. The species is a hardy herbaceous plant, with a white rhizome, tasting like Cucumber. It thrives best in a rich sandy soil. Propagated by dividing the plant, in spring.

M. asparagoides. *See* **Myrsiphyllum asparagoides.**

M. virginiana (Virginian). *fl.* yellow or greenish-yellow, in a sessile umbel. June. *l.* whorled, obovate-lanceolate, sessile. Stem erect, simple. *h.* 9in. Virginia, 1759. (B. M. 1316.)

MEDICAGO (from *Medike*, a name given by Dioscorides to a Median grass). Lucern; Medick. ORD. *Leguminosæ*. A large genus (above forty species have been described) of hardy herbs, or rarely shrubs, of scarcely any horticultural value. Flowers yellow or violet; peduncles axillary, one, two, or many-flowered. Leaves trifoliolate, stalked; leaflets usually toothed. The only species worth cultivating is *M. falcata*, which is suitable for banks or slopes, borders, and rough rockwork of all sorts. It thrives in any ordinary soil. Propagated by divisions, or by seeds. The value of *M. sativa* is wholly agricultural; and, from its great importance in that sphere, it could not be omitted from this work.

M. arborea (tree-like). *fl.* yellow, in umbellate racemes. May to November. Pods lunate, entire at edge. *l.*, leaflets obovate, light green. Stem arborescent. *h.* 2ft. to 8ft. South Europe, 1596. (L. B. C. 1379.)

Medicago—*continued.*

M. falcata (sickle-shaped). *fl.* usually pale yellow, but occasionally violet and green, in short, close, axillary racemes, on stalks longer than the leaves. Summer. *l.*, leaflets oblong, toothed at the apex, entire at base. Stems 2ft. to 4ft. long, prostrate. Europe (Britain), North Asia, and India. A hardy herbaceous perennial. (Sy. En. B. 336.)

M. marina (sea-loving). *fl.* yellow; peduncles many-flowered. June to August. Pods cochleate, roundish, muricate. *l.*, leaflets downy, obovate, entire. *h.* 1ft. South Europe, 1596. (S. F. G. 770.)

M. sativa (cultivated). Purple Medick or Lucern. *fl.* violet, large, on racemose peduncles. Summer. *l.*, leaflets obovate-oblong, toothed, mucronate. Stems erect, glabrous. *h.* 2ft. Mediterranean region (naturalised in Britain). Hardy herbaceous perennial. (Sy. En. B. 334.)

MEDICIA. A synonym of **Gelsemium** (which *see*).

MEDICK. *See* **Medicago.**

MEDINILLA (named after J. de Medinilla, of Pineda, Governor of the Marianne Islands). ORD. *Melastomaceæ*. A genus comprising about fifty species of erect or scandent, stove, evergreen, branched shrubs, natives of the East Indies, Ceylon, the Malayan and Pacific Islands, rare in the West African and Mascarene Islands. Flowers

FIG. 531. FLOWERING BRANCH OF MEDINILLA MAGNIFICA.

white or rose, bracteate or ebracteate, disposed in panicles, or in lateral, many or few-flowered cymes; bracts sometimes large, rosy; calyx entire, or four to six-toothed; petals four or five (rarely six), ovate, oblong, or obovate, acute. Berry globose or ovoid. Leaves opposite or verticillate, rarely very unequal, or solitary and alternate,

Medinilla—*continued.*

entire, fleshy, three to nine-nerved; nerves sometimes pinnate. The species do best in a compost of peat, thoroughly decomposed leaf mould, and light loam, in equal parts, with about a sixth part of silver sand added. Medinillas luxuriate in a moist atmosphere and a high temperature. All those described below are branched, more or less erect, shrubs, not climbers.

M. amabilis (lovely).* *fl.* rosy-pink, in large panicles, which are erect, and composed of four-branched whorls, the branches each forming a cyme of numerous flowers. Spring. *l.* opposite, sessile, oblong-obovate, obtuse, with a short acuminate point, 1ft. long, 7in. to 8in. broad. Stem quadrangular; angles furnished with a narrow undulated wing. India, 1874. (B. M. 6681; G. C. n. s., xvii. 561.)

M. Curtisii (Curtis').* *fl.* white, in terminal panicles; peduncles and pedicels coral-red; stamens purple. *l.* opposite, elliptic, acute, rather fleshy, three-nerved. Sumatra, 1884. (B. M. 6730.)

M. javanensis (Java). *fl.* of a pale flesh-colour, nearly 1in. across, with very dark purple anthers, disposed in short terminal panicles. Winter. *l.* opposite, sessile, somewhat cordate, elliptic, rather acuminated. *h.* 4ft. Java, 1850. (B. M. 4569.)

M. magnifica (magnificent) * *fl.* rosy-pink, borne in very large, terminal, pendulous racemes, continuing a long time in perfection. May. *l.* opposite, broadly ovate, smooth, rich shining green, 8in. to 10in. long. *h.* 3ft. Manilla. A lovely plant. See Fig. 531. (B. M. 4533.)

M. Sieboldiana (Siebold's). *fl.* white, about ¾in. across, disposed in a thyrsoid drooping panicle; stamens purple. Winter *l.* oblong, tapering to each end, fleshy. *h.* 4ft. Moluccas. (B. M. 4650.)

M. speciosa (showy). *fl.* crimson, in large, drooping, panicled racemes. July. *l.* almost sessile, four in a whorl, rarely opposite, ovate-oblong. *h.* 2ft. to 3ft. Java, 1845. (B. M. 4321.)

MEDLAR (*Mespilus germanica.*) The wild Medlar, from which the cultivated varieties have originated, is a common deciduous shrub, or small tree, found in hedges and woods throughout a great part of the European continent. It has been found in some parts of England; but whether the plants were, in all cases, truly wild, or had become naturalised, is somewhat uncertain. Under cultivation, the varieties of Medlar differ in habit, the majority being characterised by a spreading, crooked growth, many of the branches assuming an elbowed form, by turning at right angles in various directions. The fruits are produced on the points of main or side shoots. They are hard and useless until beginning to decay, when the green colouring matter passes away, the flesh or pulp becoming soft, and acquiring what is considered by some an agreeably acid flavour. In this incipient state of decay (the process of which is called *bletting*), the fruits are generally eaten raw, but sometimes they are preserved with sugar.

Propagation. The general method of propagation adopted for Medlars is that of budding or grafting. Seedling plants may also be raised, if desired, with a view to obtaining new varieties or stocks. The seeds should be sown so soon as the fruit is ripe. Two years usually elapse before they vegetate, and the young plants must be tied and kept in an upright position, to preserve tolerably straight stems. Besides the Medlar itself, the Pear, Quince, and Whitethorn may also be used as stocks whereon to bud or graft the cultivated varieties. The Pear stock is well adapted for grafting standard high, and succeeds well on ordinary soils; the Quince roots near the surface, and is suited, in consequence, for moist situations; while the White Hawthorn is readily obtained in quantity, is preferred as a stock on the Continent, and is, perhaps, best for light soils and comparatively dry situations. Cleft-grafting in April, with scions of the previous summer's growth, having the extremities removed, and shield-budding, with well-formed dormant buds, in July, are the two methods of propagation usually pursued. The heading-down, or disbudding, of the stock must be attended to so soon as a union is effected between it and the bud or graft, and the latter will require to be kept well staked. *See also* **Budding** and **Grafting.**

Medlar—*continued.*

General Cultivation. Medlars are not very particular regarding soil; but they generally succeed best in somewhat sheltered positions, where the soil is loamy, and inclined to be moist rather than dry. The trees are usually trained as standards, and require but little pruning, beyond thinning out weak growths, to admit light and air to the stronger ones, and to prevent the branches crossing each other. The large Dutch Medlar, which is very extensively cultivated, assumes a naturally crooked and rustic growth; while the small-fruited Nottingham variety is distinct in being of better quality, and of an upright habit. The fruit from Medlars should not be gathered until about the end of October, or even later, if frosts are not prevalent. It should be collected on a dry day, and laid out thinly on a cool fruit-room shelf. A fungus frequently attacks the stems, and passes to other parts, of the fruit, thus rendering it useless. This must be looked for occasionally, and any specimens that are found affected should be at once removed. The process of *bletting* usually takes from two to three weeks at the least, and some fruits may keep good for several weeks afterwards.

Varieties. The following are the best sorts of Medlar in cultivation:

Dutch. Fruit very large, and much flattened, sometimes 2in. in diameter; eye wide open; flavour good, but inferior to the Nottingham. The most extensively cultivated variety, on account of its size. SYNS. Broad-leaved Dutch, Large Dutch, &c.

Nottingham. Fruit smaller than the preceding, about 1in. in diameter, of a rich sub-acid flavour, superior to any other variety. The leaves are small, and the tree of upright-growing habit. SYN. Small-fruited.

Stoneless. Fruit small, from ½in. to ¾in. in diameter. The fruits are destitute of stones, and are only valuable on account of their keeping longer than those of the varieties above named; the quality is not so good.

MEDLAR, JAPANESE. *See* **Photinia japonica.**

MEDORA. A synonym of **Smilacina** (which *see*).

MEDULLARY SYSTEM. "The cellular tissue of the ring, disk, and bands, constitutes the Medullary System. The Medullary System of the disk is called the pith, that of the ring is the cortical pith, and the radiating cellular bands are the Medullary Rays" (Hooker).

MEGACARPÆA (from *megas*, great, and *karpos*, a fruit; in allusion to the large pods). ORD. *Cruciferæ.* A genus consisting of only three species of large, robust, branched herbs, with thick perennial roots, natives of Siberia, the Himalayas, and Thibet. Flowers white or violet, racemose or corymbose; sepals equal at base; stamens six or many, free, edentulate. Pods large, indehiscent, laterally much compressed. Leaves glaucous, pinnatisect. The undermentioned species thrives in light sandy soil, and is increased readily by seeds. *M. polyandra*, a Himalayan species, is, perhaps, not now in cultivation.

M. laciniata (jagged). *fl.* yellow, small; stamens six; valves ovate, broadly winged. June and July. *l.* villous; radical ones stalked, pinnate-parted, with deeply toothed or cut lobes. Stems furnished at the neck with the vestiges of the petioles of the preceding year. *h.* 6in. to 12in. Caspian Desert, &c., 1818.

MEGACARPHA. A synonym of **Oxyanthus** (which *see*).

MEGACLINIUM (from *megas*, large, and *kline*, a bed; referring to the axis or rachis on which the flowers are borne). ORD. *Orchideæ.* A genus comprising about nine species of stove epiphytal orchids, natives of tropical and Southern sub-tropical Africa. They are closely allied to *Bulbophyllum.* The species are more curious than beautiful. The singular flattened scape is a good distinguishing mark of this genus. For culture, *see* **Bulbophyllum.**

M. bufo (toad). *fl.* brown, purple, covered with black hairs; sepals acute, upper one smooth, lateral ones downy inside; petals small, acute, glabrous; lip ovate, fleshy, wrinkled. March to June. Sierra Leone, 1839. (G. C. 1841, p. 348.)

Megaclinium—*continued.*

M. falcatum (falcate). *fl.* yellow, red; upper segments of perianth obtuse, callous on both sides at apex; outer lateral ones reflexed, bidentate; inner ones or petals smaller, subulate, obtuse. *l.* oval, emarginate, biplicate. Pseudo-bulbs tufted, rather tetragonal, two-leaved. Sierra Leone, 1822. (B. R. 989.)

M. maximum (largest). *fl.* yellow, spotted blood-colour, sessile, appearing like little tadpoles, borne in a line on the middle, on each side of the broad, flat, sword-shaped, green rachis (scape), which arises from the base of the pseudo-bulbs, and is longer than the leaves. June and July. *l.* two or three, ligulate. Pseudo-bulbs oblong, angled. Sierra Leone. (B. M. 4028; B. R. 1959.)

M. purpuratum (purple). *fl.* yellowish, speckled and streaked with purple; rachis 4in. to 6in. long, 1in. broad, pale yellow-green, sprinkled with red-purple. *l.* linear-oblong, in pairs at the top of the pseudo-bulb, obtuse, keeled. Western tropical Africa, 1871. (B. M. 5936.)

MEGARRHIZA (from *megas*, large, and *rhiza*, root; alluding to the large tuberous rootstock). ORD. *Cucurbitaceæ*. A curious and interesting, rather than handsome, hardy tuberous perennial, now included under *Echinocystis*. The plant thrives in a good light soil. Propagated by sowing seeds, in a gentle heat, in spring. This species is peculiar in the thick fleshy cotyledons of the large, turgid, emarginate seeds remaining under the ground in germination.

FIG. 532. MEGARRHIZA CALIFORNICA, showing Flowering Stem with the Racemose Male Flowers and the Solitary Fertile Ones from the same Axils; detached Fruit; and Section of Seed.

M. californica (Californian). *fl.*, males small, racemose; females solitary, produced on stalks at the base of the raceme of the males. *fr.* roundish or oblong, about 2in. in length, densely covered with spines, and very closely resembling a sweet chestnut. *l.* glossy, silvery, palmately lobed. California, 1880. See Fig. 532.

MEGASEA. Included under **Saxifraga** (which *see*).

MEIRACYLIUM (from *meirakyllion*, a small boy; probably in reference to the size of the plants). ORD. *Orchideæ*. A small genus of stove epiphytal orchids, natives of Mexico and Central America. Flowers small, pedicellate; peduncles one or two-flowered; sepals erecto-patent, sub-equal; petals similar; lip continuous with the base of the short, thickish column. Leaves short, broad, sessile, thickly fleshy. The undermentioned species is a very pretty and interesting little orchid. It should be grown on a block of wood. For general culture, *see* **Pleurothallis.**

M. gemma (gem). *fl.* amethyst-coloured, solitary, few, shortly pedicellate. *l.* sessile, broad-cordate. Stems very short, from a creeping rhizome. Mexico.

MELALEUCA (from *melas*, black, and *leukos*, white; the trunk is black, and the branches are white). ORD. *Myrtaceæ*. A genus comprising about 100 species of

Melaleuca—*continued.*

mostly greenhouse evergreen shrubs or trees, all natives of Australia, but one, *M. leucadendron*, also widely distributed throughout tropical Asia. Flowers red, white, or yellow, closely sessile and solitary within each bract or floral leaf, in heads or spikes, or rarely solitary and scattered; calyx lobes five, imbricated or open; petals five, orbicular, spreading. Leaves alternate, or in a few species opposite, entire, usually coriaceous, flat, concave, or semi-terete. The species thrive in a compost of peat and sandy loam. Propagated, in May, by cuttings, about 3in. in length, getting firm at the base, placed in a compost similar to that just named. The shoots must be freely topped while young, to induce a bushy growth.

M. armillaris (bracelet). *fl.* white; spikes cylindrical, quite glabrous. June. *l.* alternate, linear-subulate, mucronate, recurved at the apex. *h.* 6ft. to 8ft. 1788. Shrub. (A. B. R. 175, under name of *M. ericæfolia*.)

M. coronata (crowned). A synonym of *M. thymifolia*.

M. decussata (decussate). *fl.* lilac, rather small, either in oblong or globular lateral heads and spikes and barren, or in oblong or cylindrical interrupted spikes and fertile. August. *l.* mostly opposite, oblong-lanceolate to almost linear, or very rarely broad, obtuse or acute. *h.* 20ft. 1803. A glabrous shrub. (B. M. 2268; L. B. C. 1208.)

M. diosmifolia (Diosma-leaved). *fl.* greenish-yellow; spikes oblong, glabrous. June. *l.* alternate, oval or lanceolate, petiolate, flat, crowded. *h.* 3ft. to 10ft. 1794. Shrub. (A. B. R. 476.)

M. ericæfolia (Erica-leaved), of Andrews. A synonym of *M. armillaris*.

M. ericifolia (Erica-leaved). *fl.* pale yellow; spikes oval, glabrous. July to September. *l.* scattered, narrow-linear, spreading or somewhat recurved. 1788. Shrub or tree. (S. E. B. 34.)

M. Fraseri (Fraser's). A synonym of *M. striata*.

M. fulgens (glittering). *fl.* scarlet, as long as, or longer than, those of other species; spikes oval, quite glabrous. July to September. *l.* opposite, lanceolate-linear, acute. *h.* 6ft. to 20ft. 1803. Shrub. (B. R. 103; L. B. C. 378.)

M. genistifolia (Genista-leaved). *fl.* red, in loose oblong or cylindrical spikes; petals very deciduous. June. *l.* scattered, lanceolate or linear-lanceolate, rigid, acute, and often pungent-pointed. *h.* 4ft. (in its native habitats, 30ft. to 40ft.). 1793. A glabrous or pubescent shrub or tree. (S. E. B. 55.)

M. hypericifolia (Hypericum-leaved). *fl.* of a splendid scarlet; spikes cylindrical, quite glabrous. June to August. *l.* opposite, decussate, elliptic-oblong, with a recurved margin. *h.* 10ft. to 20ft. 1792. Shrub or small tree. (A. B. R. 200; L. B. C. 199.)

M. incana (hoary). *fl.* yellowish-white, rather small, in dense, terminal, ovoid or oblong spikes. July. *l.* scattered or irregularly opposite, or in whorls of three, very spreading, often crowded. *h.* 3ft. 1817. A hoary-tomentose or pubescent shrub. (B. R. 410.)

M. leucadendron (white-tree). Cajuput-tree. *fl.* white, in spikes, rather distant, glabrous; flowering branches pendulous. *l.* alternate, long-lanceolate, acuminated, falcate. *h.* 15ft. to 20ft. 1796. Stove tree. From the leaves of *M. l. minor* is obtained Cajuput Oil, a limpid, very volatile oil, of a pale bluish-green colour; its properties are stimulant, antispasmodic, and diaphoretic when administered internally, and externally applied it is rubefacient. The annually shed bark of the type is used by the Australian aborigines for tinder, for making shields and canoes, and for the covering of huts.

M. pulchella (neat). *fl.* reddish, usually solitary, glabrous. June to September. *l.* scattered or nearly opposite, oval or oblong, obtuse. *h.* 2ft. to 3ft. 1803. Shrub. (L. B. C. 200.)

M. squamea (scaly). *fl.* reddish purple, white, or yellowish, rather small, in globular terminal heads; calyx villous. June. *l.* scattered, numerous, usually spreading, ovate-lanceolate to almost linear. *h.* 4ft. 1805. Shrub. See Fig. 533. (B. R. 477; L. B. C. 412.)

M. squarrosa (squarrose). *fl.* yellowish-white, sessile, in oblong cylindrical spikes of from 1in. to 2in.; bracts sometimes almost like the stem leaves. June to August. *l.* mostly opposite or nearly so, from broadly ovate-cordate to ovate-lanceolate, rigid, acute, almost pungent. *h.* 6ft. to 10ft. 1794. A handsome erect shrub. (B. M. 1036; L. B. C. 1130.)

M. striata (striped). *fl.* pink, in dense, oblong or cylindrical, terminal spikes. June. *l.* alternate, lanceolate or linear, acute, and often pungent pointed, flat. *h.* 4ft. 1803. Shrub, with young shoots silky, at length glabrous. SYN. *M. Fraseri* (under which name it is figured in B. M. 3210).

Melaleuca—*continued.*

M. styphelioides (Styphelia-like). *fl.* white, in pubescent spikes, surrounding the lower part of the branches. May to July. *l.* alternate, ovate, acuminated, ending in a pungent mucrone, sessile, glabrous. *h.* 4ft. to 10ft. 1793. Shrub.

FIG. 533. FLOWERING BRANCHES OF MELALEUCA SQUAMEA, reduced and natural size.

M. thymifolia (Thyme-leaved). *fl.* purple; spikes few-flowered. June to September. *l.* opposite, lanceolate. *h.* 2ft. 1792. Shrub. (B. M. 1868; L. B. C. 439.) SYN. *M. coronata* (A. B. R. 278).

M. Wilsonii (Wilson's). *fl.* red, solitary or two or three together in the axils of the stem leaves, often numerous along the principal branches. *l.* opposite, almost imbricate on the smaller branches, linear or linear-lanceolate, erect or scarcely spreading. 1874. Shrub. (B. M. 6131.)

MELAMPYRUM (from *Melampuron*, an old Greek name used by Theophrastus, from *melas*, black, and *pyros*, wheat; alluding to the colour of the seeds of European field species, as they appear mixed with grain). Cow Wheat. ORD. *Scrophularineæ.* A genus comprising about six species of hardy, erect, annual herbs, found in Europe and Western Asia, one being broadly dispersed over Asia and North America. Flowers sub-sessile in the axils, or in dense terminal spikes; corolla yellow, violet, or variegated. Leaves opposite, narrow. The two species described below are the handsomest, but, in addition to these, *M. pratense*, the common Cow Wheat, and *M. sylvatica*, are found in Britain. Melampyrums, being more or less parasitic, are not easily grown under artificial conditions. Seeds should be sown annually, in spring, in the open border; if amongst short grass, &c., success is more likely to be attained.

M. arvense (field). *fl.* spiked; corolla erect; tube rosy, curved, puberulous; throat yellow; lips dark pink; bracts rose-purple, leafy. July and August. *l.* lanceolate, quite entire, or the upper toothed at the base. Stem 1ft. to 2ft. high, obtusely quadrigonous, stout, erect, branched, scaberulous. Europe (Britain), Western Asia. (Sy. En. B. 1001.)

M. cristatum (crested). *fl.* densely spiked; corolla tube yellow, tipped with purple, bent. September and October. *l.* spreading, narrow linear-lanceolate. Stem 6in. to 18in. high, rigid, erect, obtusely four-angled. Europe (Britain), Siberia. (Sy. En. B. 1000.)

MELANDRIUM. Included under **Lychnis** (which *see*).

MELANOPTERIS. Included under *Aspidium.*

MELANORRHŒA (from *melas*, black, and *rheo*, to flow; the tree, when wounded, yields a black juice). Black Varnish Tree. ORD. *Anacardiaceæ.* A genus comprising a couple of species of very large-growing stove evergreen trees, natives of Birma and the Malayan Peninsula. Flowers in axillary panicles; sepals five, cohering valvately into a five-nerved, caducous calyptra; petals five or six, linear-oblong, imbricated. Leaves alternate exstipulate, simple, entire, leathery. The undermentioned species thrives in a peat and loam compost.

Melanorrhœa—*continued.*

Propagated by cuttings of ripe shoots, with the leaves intact, placed in sand, under a glass, and in bottom heat.

M. usitatissima (most useful). *fl.* red. *l.* obovate, very blunt, villous. *h.* 100ft. Hindostan, 1828. This species yields a very valuable black varnish. "This is obtained by the process of tapping; short joints of bamboo, closed at the bottom end, being thrust into holes made in the trunk, and left for about two days, when they become full of a whitish thick juice, which turns black when exposed to the air, and requires to be kept under water in order to preserve it" ("Treasury of Botany").

MELANTHACEÆ. Included, by Bentham and Hooker, under *Liliaceæ.*

MELANTHERA (from *melas*, black, and *anthera*, an anther; alluding to the colour of the anthers). ORD. *Compositæ.* A genus comprising about eight species of scabrous-pubescent or slightly villous, stove, greenhouse, or half-hardy, herbs or sub-shrubs, natives of tropical America and Africa. Flower-heads white or yellow, mediocre; young ones depressed, at length sub-globose, borne at the apices of the branches or in the axils of the upper leaves; involucre hemispherical, short, the bracts two or three-seriate; receptacle convex or at length conical; achenes glabrous or slightly pilose. Leaves opposite, petiolate, toothed, or rarely hastately trilobed. The species thrive in any ordinary soil, and may be increased either by seeds or by divisions.

M. deltoidea (deltoid). *fl.-heads* yellow; involucral scales oval-oblong; chaff of the receptacle obtuse, mucronate. July and August. *l.* opposite, undivided, ovate-deltoid or sub-cordate, scabrous-canescent. *h.* 3ft. West Indies, &c., 1799. Stove herb. SYN. *Calea aspera.*

M. hastata (spear-shaped). *fl.-heads* white; involucral scales lanceolate; chaff of the receptacle spine-pointed. June and July. *l.* opposite, hastately trilobed, scabrous. *h.* 3ft. to 6ft. North America, 1732. Half-hardy herb. The variety *pandurata* has fiddle-shaped leaves.

MELANTHIUM (from *melas*, black, and *anthos*, a flower; in allusion to the darker colour which the persistent perianth assumes after blossoming). SYN. *Leimanthium.* ORD. *Liliaceæ.* A genus comprising only three species of hardy bulbous plants, confined to North America. Flowers yellowish-white, small, copiously racemose-paniculate; perianth of six widely-spreading segments. Leaves linear or lanceolate, membranous, glabrous. Stems loose, leafy. The species are not much grown in our gardens. For culture, &c., *see* **Veratrum.**

M. virginicum (Virginian). Bunch Flower. *fl.*, perianth cream-colour, turning brown, and persistent; segments heart-shaped or oblong and halbert-shaped. July. *l.* lanceolate or linear, grass-like, those from the root broader. Stem simple, 3ft. to 5ft. high. (B. M. 985, under name of *Helonias virginica.*)

MELASMA (from *melasma*, blackness; the plant turns black when dried). SYNS. *Gastromeria, Lyncea, Nigrina.* ORD. *Scrophularineæ.* A genus comprising three or four species of stove or greenhouse, scabrous-pubescent or hispid herbs, of which two (perhaps varieties of one) are natives of South Africa, the third is Brazilian, and the fourth Mexican. Flowers in terminal leafy racemes, which are sometimes long-interrupted at base; calyx broadly ovate-campanulate, foliaceous, five-fid at apex, the lobes valvate; corolla white or pale yellowish, five-lobed, imbricated; tube broad, sub-campanulate, shorter than the calyx or shortly exserted. Leaves opposite, sessile, entire, toothed, or slightly incised at base. Probably none of the species are in cultivation.

MELASPHÆRULA (from *melas*, black, and *sphærula*, a diminutive of *sphaira*, a ball; referring to the small blackish bulbs). SYNS. *Aglæa, Diasia.* ORD. *Irideæ.* A monotypic genus, the species being a very pretty, greenhouse, bulbous plant, with an elegant and graceful habit, and producing a profusion of flowers, which remain in perfection for a considerable period. For culture, *see* **Ixia.**

M. graminea (grass-like). *fl.* whitish, with a purplish stripe, disposed in large flexuous-branched panicles. April. *l.* grass-like,

Melasphærula—*continued.*

light green. South Africa, 1880. (B. M. 615; L. B. C. 1444, under name of *M. parviflora;* A. B. R. 62, under name of *Gladiolus gramineus.*)

M. parviflora (small-flowered). A synonym of *M. graminea.*

MELASTOMA (from *melas*, black, and *stoma*, the mouth; the black berries of certain species, when eaten, stain the mouth). ORD. *Melastomaceæ.* A genus comprising about forty species of stove evergreen, often erect, and strigose-pilose shrubs; one species creeping. They are natives of tropical Asia, Africa, North Australia, Oceania, and (one species) the Seychelles. Flowers purple, violet, or rose, rarely white, showy, bibracteate, at the apices of the branchlets, solitary, sub-fasciculate or paniculate; calyx strigose, setose, or paleaceous; lobes five, rarely six or seven; petals often five, obovate or unequilateral, sometimes ciliated at base. Leaves petiolate, oblong or lanceolate, coriaceous, entire, three to seven-nerved. Few of the species are now in cultivation. They thrive best in a compost of equal parts loam and peat. Propagated, during spring, by cuttings, placed in sandy peat, under a bell glass, in heat. In winter, a rather dry atmosphere is desirable.

M. corymbosum (corymbose). *fl.* bright purple, in terminal corymbs. Summer. *l.* stalked, cordate-ovate, glabrous, seven to nine-nerved, rich satiny-green above, paler beneath; margins sharply dentate-serrate. Tropical Africa. (B. M. 904.) By an oversight, this species was not described under *Amphiblemma*; its correct name is *A. cymosum* (B. M. 5473).

M. denticulatum (toothed). *fl.* white, few, cymose; calyx lobes lanceolate. July. *l.* petiolate, oval-oblong, acuminate, five-nerved, bristly above, pale beneath. *h.* 3ft. to 4ft. New Caledonia, 1855. (B. M. 4957.)

M. macrocarpum (long-fruited). A synonym of *M. malabathrica.*

M. malabathrica (Malabar). *fl.* purple, large; corymbs one to five-flowered. July. *l.* elliptic-oblong, obtuse at the base, acute at the apex, quite entire. Branches tetragonal, rough from strigæ. *h.* 6ft. to 8ft. East Indies, 1793. (B. M. 529; B. R. 672, under name of *M. macrocarpum.*)

M. sanguineum (bloody-veined). *fl.* purple, large, few, terminal; petals six, large. September and October. *l.* ovate-lanceolate, acuminate, five-nerved, green above and shining, but red at the nerves beneath and on the short petioles. *h.* 4ft. to 6ft. Straits of Sunda, 1818. (B. M. 2241.)

MELASTOMACEÆ. An order of erect herbs, shrubs, or trees, principally found in tropical America. Flowers variable in colour, showy, very rarely sweet-scented; inflorescence spicate, paniculate or corymbose, in a few cases solitary or fasciculate; calyx limb five, six, or three-partite, sometimes entire, imbricate, or contorted in the bud; petals free, or sometimes slightly united at the base, inserted on the calyx throat, on a fleshy annular layer, alternate with the calyx segments, shortly clawed, twisted in the bud. Leaves opposite or whorled, simple, equal or unequal, entire, rarely toothed, usually narrowed into a sometimes swollen petiole; stipules none. The order comprises about 134 genera, and 1800 species. Illustrative genera are: *Bertolonia, Melastoma, Miconia, Pleroma,* and *Rhexia.*

MELHANIA (from Mount Melhan, in Arabia Felix, where the original species of this genus was discovered). SYNS. *Brotera* and *Sprengelia.* ORD. *Sterculiaceæ.* A genus comprising about sixteen species of softly tomentose, stove or greenhouse shrubs or sub-shrubs, natives of Africa, the warmer parts of Asia, and tropical Australia. Flowers yellow, white, or reddish; petals five, rarely spreading; bracteoles often longer than the sepals; peduncles axillary, one or few-flowered. Leaves ovate or cordate, crenate-serrate. *M. erythroxylon* is a handsome greenhouse shrub or small tree, of which only a very few individuals now exist in its native habitat. *M. melanoxylon* (also from St. Helena) has, within comparatively recent years, become quite extinct in a wild state, and, probably, no longer exists even in cultivation.

M. erythroxylon (red-wooded). *fl.* at first pure white, changing after a day to pink, and finally to a brownish-red as they begin to fade. June. *l.* ovate-cordate, somewhat peltate, acuminated, crenulated, tomentose beneath. *h.* 15ft. St. Helena, 1772. The wood of this tree is hard and of a dull brown colour. (B. M. 1000.)

MELIA (from *Melia*, the Greek name for the Ash; in allusion to the resemblance in the leaves). Bead-tree. ORD. *Meliaceæ.* A genus comprising about five species of stove, greenhouse, or half-hardy trees, natives of tropical Asia and Australia, one species being widely dispersed by introduction. Flowers white or purple, in large, axillary, much-branched panicles; calyx five or six-parted, imbricated; petals five or six, free, linear-spathulate, spreading. Fruit drupaceous, small. Leaves alternate, pinnate, or bi- or tripinnate; young ones, together with the inflorescence, often stellato-tomentose; leaflets petiolulate, dentate or serrate. Branches covered with scars. The species are of easy culture in a sandy-loam soil. Propagated by cuttings, placed in sand, under a bell glass, in gentle bottom heat. The name Bead-tree has been given to the species of this genus, on account of the use made of the seeds in Catholic countries, "where the nuts are threaded for beads, to assist the devotion of good Catholics, for which purpose they are peculiarly suited, having a natural perforation through the centre; hence the tree has been called *Arbor Sancta*" ("Botanical Magazine").

M. Azadirachta (Azadirachta). *fl.* bluish. Summer. *l.* pinnate; leaflets ovate-lanceolate, unequal at the base, acuminated, dentately-serrated; petioles terete. *h.* 20ft. East Indies, 1759. Stove. (B. F. S. 14.)

FIG. 534. PORTION OF INFLORESCENCE OF MELIA AZEDARACH.

FIG. 535. FLOWERING BRANCH, AND DETACHED FLOWER AND FRUIT, OF MELIA AZEDARACH FLORIBUNDA.

M. Azedarach (Azedarach). *fl.* lilac, fragrant. Summer. *l.* bipinnate; leaflets deeply serrated, somewhat quinate. *h.* 40ft. Tropical Asia, &c., 1656. Hardy in the South of England. See Fig. 534. (B. F. S. 13; B. M. 1066.) *M. A. floribunda* is more floriferous than the type, and flowers in a smaller state. See Fig. 535. (R. H. 1872, 470.)

M. composita (compound). A synonym of *M. dubia.*

Melia—*continued.*

M. dubia (doubtful). *fl.* whitish or pinkish; peduncles, calyces, and petals rather velvety. Summer. *l.* somewhat bipinnate, but at the apices of the petioles they are simply pinnate; leaflets almost entire, lower ones ternate. *h.* 30ft. Tropical Asia, Australia, and Africa, 1810. Stove. SYN. *M. composita.*

M. japonica (Japanese). *fl.* lilac, fragrant, in large axillary panicles. Summer. *l.* large, bipinnate; leaflets few, distant, ovate, crenate. *h.* 20ft. to 40ft. Japan, 1865. A very ornamental half-hardy tree.

M. sempervirens (evergreen). *fl.* bluish. Summer. *l.* bipinnate; leaflets deeply toothed, usually seven in number, shining when young. *h.* 25ft. Jamaica, 1656. Stove. (B. R. 643.)

MELIACEÆ. A rather large order of trees and shrubs, very rarely sub-herbaceous. They are found principally in the tropical parts of Asia and America. Flowers dicœcious, or rarely polygamo-dicœcious, regular, terminal or axillary, panicled; calyx generally small, four or five-fid; æstivation usually imbricate; petals hypogynous, four or five, rarely three to seven, sometimes free and contorted or imbricate, sometimes connate, or adnate to the staminal tube, and valvate. Leaves alternate, exstipulate, very rarely dotted, pinnate, or rarely simple, entire. The wood of many species of *Meliaceæ* is often called Cedar, and is esteemed, not only on account of its aromatic fragrance, but for its density and fine colour. To this order belongs *Swietenia Mahagoni*, which yields the Mahogany of commerce. There are about thirty-seven genera and 270 species. Examples are: *Aglaia*, *Melia*, and *Swietenia*.

MELIANTHEÆ. A tribe of *Sapindaceæ*.

MELIANTHUS (from *meli*, honey, and *anthos*, a flower; calyces full of honey). Honey Flower. ORD.

FIG. 536. FLOWERS AND LEAF OF MELIANTHUS COMOSUS.

Sapindaceæ. A small genus (four species) of half-hardy or greenhouse, glaucous or canescent, often strongly scented shrubs; they are natives of the Cape of Good Hope, but one is found on the Himalayas, where it has been introduced. Flowers shortly pedicellate, bracteate; lower ones sometimes apetalous; racemes terminal and axillary; calyx five-parted; petals five, narrow, long-clawed. Leaves alternate, stipulate, impari-pinnate;

Melianthus—*continued.*

leaflets unequally toothed, decurrent. The species most frequently seen in cultivation is *M. major*; this is a very ornamental plant, and is largely employed in sub-tropical gardening. It is not, strictly speaking, hardy, but thrives very well in the open air, throughout the year, if the roots are protected, in the winter, by a covering of leaves. It makes an admirable conservatory plant. Propagated by seeds, or by cuttings, which latter strike freely under a hand glass.

M. comosus (tufted). *fl.* green at base; sepals and petals orange-yellow within, the larger marked externally with a red spot. Autumn. *l.* 4in. to 6in. long; leaflets lanceolate, serrate. *h.* 3ft. to 5ft. Greenhouse. See Fig. 536. (B. M. 301, under name of *M. minor.*)

FIG. 537 MELIANTHUS MAJOR.

M. major (great).* *fl.* brownish, in rather long spikes springing from the axils of the upper leaves. Summer. *l.* stem-clasping, smooth, glaucous; leaflets four or five, large, deeply cut into acute divisions. Stems hollow, woody at base. *h.* 4ft. to 6ft. 1688. Greenhouse. See Fig. 537. (B. R. 45.)

M. minor (small). *fl.* dark brown, in whorls; racemes axillary, elongated, drooping. August. *l.* smooth above and hoary beneath. *h.* 5ft. 1696. Greenhouse.

M. pectinatus (pectinate). *fl.* in whorls of four to six; petals four, scarlet, clawed; disk fleshy, horseshoe-shaped; racemes terminal, erect, 4in. to 8in. long. Winter. *fr.* ¾in. in diameter, cruciately four-winged. *l.* 3in. to 5in. long, shortly petioled, glabrous above, white-tomentose beneath, pinnate; pinnules six to ten pairs, opposite, linear-strap-shaped. *h.* 6ft. to 10ft. A singular and beautiful conservatory plant. (B. M. 6557, under name of *M. Trimenianus.*)

M. Trimenianus (Dr. Trimen's). A synonym of *M. pectinatus.*

MELICHRUS (from *melichros*, honey-coloured; in reference to the colour of the glands of the flowers). ORD. *Epacrideæ.* A small genus (two species) of very ornamental greenhouse shrubs or sub-shrubs, with a procumbent or somewhat erect habit, restricted to Eastern temperate Australia. Flowers erect; corolla rotate or urceolate, furnished near the base with five glands, alternating with the stamens; segments bearded. Leaves sessile, lanceolate. The species thrive best in sandy peat. Propagated by cuttings of the shoots, about 2in. long, inserted in sandy soil.

Melichrus—*continued.*

M. medius (intermediate). A synonym of *M. urceolatus*.

M. rotatus (wheel-shaped). *fl.* scarlet; corolla rotate. June. *l.* lanceolate-linear, pilose on both surfaces and on the margins. 1824. Procumbent shrub.

M. urceolatus (urceolate). *fl.* scarlet; corolla urceolate. April. *l.* lanceolate, attenuated, very acute, mucronate, concave, with membranous, denticulated edges. *h.* 2ft. 1824. Erect shrub. SYN. *M. medius*.

MELICOCCA (from *meli*, honey, and *kokkos*, a berry; the taste of the fruit is very sweet). ORD. *Sapindaceæ*. A genus comprising two or three species of stove trees, generally very glabrous, natives of the West Indies, Brazil, and Venezuela. Flowers regular, polygamo-dicœcious; racemes elongated, simple or paniculately branched, many-flowered. Drupe ovoid, edible. Leaves alternate, exstipulate, abruptly pinnate; leaflets two or three-jugate, almost opposite, sessile, membranaceous. The species thrive in a compost of loam and peat. Propagated by ripened cuttings, placed in sand, under a bell glass, in heat.

M. bijuga (two-paired). Honey Berry. *fl.* yellow; racemes terminal and axillary, simple, spike-formed. *fr.* as large as a bullace, jet-black, with a very sweet, pleasant taste. *l.* with two pairs of leaflets. *h.* 40ft. to 50ft. West Indies, &c., 1778.

MELICOPE (from *meli*, honey, and *kope*, a division; in allusion to the four honey-glands at the base of the ovaries). ORD. *Rutaceæ*. A genus consisting of about fifteen species of gland-dotted, glabrous, greenhouse shrubs, natives of New Zealand and the Pacific Islands. Flowers white, rather small; cymes axillary, three-flowered, or paniculately branched and many-flowered. Leaves opposite (rarely alternate), simple or one to three-foliolate, very rarely pinnate; petioles simple or winged; leaflets entire or crenate. The species described below is the only one known to cultivation. It thrives in a compost of sandy loam, with a little peat and leaf mould. Propagated, in May, by cuttings of small side shoots, inserted in sand, under a bell glass.

M. ternata (three-leafleted). *fl.* greenish-white, in peduncled, trichotomous, axillary cymes. June. *l.* opposite, trifoliolate; leaflets 3in. to 4in. long, ovate or linear-oblong, acute, entire, longer than the petioles. *h.* 12ft. to 15ft. New Zealand, 1822.

MELILOT. *See* **Melilotus.**

MELILOTUS (old Greek name used by Dioscorides, from *meli*, honey, and *Lotus*; the plants are said to be the favourite resort of bees). Melilot. ORD. *Leguminosæ*. A genus comprising about forty species of hardy herbaceous plants, of no horticultural value, allied to *Trifolium*. Flowers yellow or white, disposed in loose racemes. Leaves trifoliolate; leaflets usually toothed. The genus is represented in the British Flora by three species, one or more often being cultivated as "Bee Plants."

MELISSA (from *melissa*, a bee; bees are said to gather honey from these plants). Balm. ORD. *Labiatæ*. A genus containing three or four species of hardy herbaceous perennials, or very rarely under-shrubs, natives of Central and Western Asia. Flowers white or yellowish, variously disposed, racemose or whorled. For culture, *see* **Balm**.

M. officinalis (officinal). Common Balm. *fl.* white or pale yellow; cymes distinct, three to six-flowered; whorls distant. June to October. *l.* broad ovate, crenated, truncate at the base, or cordate. Stem herbaceous, erect, branched. *h.* 2ft. to 4ft. Central and South Europe (Britain), naturalised in West Asia. (Sy. En. B. 1053.) A variegated form is sometimes seen in cultivation, and forms a very pretty edging plant in almost any soil; it is, moreover, very fragrant.

MELITTIS (from *melitta*, another form of the Greek *melissa*, a bee, to which insect the plant was considered specially grateful). Bastard Balm. ORD. *Labiatæ*. A monotypic genus, the species being a very handsome, hardy, native perennial. It thrives almost anywhere, and in any soil; but, in a slightly-shaded spot, and in well-enriched loam, the result will amply repay the trouble taken. The plant is most distinct in character, and should be grown extensively on the margins of shrubberies, and in

Melittis—*continued.*

herbaceous borders generally. Propagated by dividing the plants after flowering.

FIG. 538. MELITTIS MELISSOPHYLLUM.

M. Melissophyllum (Balm leaved). *fl.* cream white, spotted pink or purple; corolla 1in. to 2in. long; whorls about six-flowered, axillary. May. *l.* on short petioles, 1in. to 2in. long, ovate, crenated, cordate at the base, opposite, slightly hairy. Stems erect, simple, more or less hairy. *h.* 1ft. to 1½ft. Europe (Britain). See Fig. 538. (Sy. En. B. 1062.) The variety known as *grandiflora* differs in having the corolla cream coloured, with the middle of the lower lip purplish-red. (Sy. En. B. 1063.)

MELLEOUS. Having the taste or smell of honey.

MELLIFEROUS. Honey-bearing.

MELOCACTUS (from *Melon*, a Melon, and *Kaktos*, a name applied by Theophrastus to a spiny plant; the species of this genus are melon-formed, and their angles are beset with tufts of spines). Melon Thistle. ORD. *Cacteæ*. A genus comprising about thirty species of stove succulent plants, inhabiting Mexico, Brazil, and the West Indies, a few being found in New Granada. Melocactuses are not often seen in cultivation, and are more

FIG. 539. MELOCACTUS COMMUNIS.

grotesque than beautiful. They closely resemble each other in general characters, which are "a globular, unbranched, fleshy stem, 1ft. to 3ft. in diameter, regularly ribbed from base to summit, the ridges bearing a varying number of clusters of spines, and a cylindrical portion, termed the cap, produced from the apex of the stem, formed of a woolly substance, and closely-set, softer spines than those on the main stem. Upon this the

Melocactus—*continued.*

small flowers are borne, tubular in form, and red or rose-coloured" (Castle, "Cactaceous Plants"). The species generally grow in exceedingly dry, rocky or sandy situations. The one most generally cultivated is *M. communis*, which is very difficult to grow with anything approaching success. Essential elements in its culture are a high temperature, very porous soil, plenty of drainage, and but little water. *See also* **Cactus.**

M. communis (common). Melon Cactus; Turk's Cap. *fl.* rosy-red, tubular, 1in. long. Stems from 1ft. to 1½ft. high, 1ft. in diameter; ridges from twelve to twenty, 1in. to 1½in. deep, conical, bearing clusters of eight or nine spines, ¼in. to 1in. long. West Indies, 1788 See Fig. 539. (B. M. 3090.)

M. depressus (depressed). *fl.* rose-coloured. July. *fr.* a club-shaped berry, about 1in. long. Stem depresso-conical, not more than 6in. across, with rounded sides; ribs about ten, acute, each bearing four or five clusters of strong, spreading, pale brown or ashen-green spines, five to seven in a cluster; at the summit of the stem is a short crown, less than ¾in. high, and about 2½in. in diameter, of woolly substance, filled with exserted red aculei. Pernambuco. (B. M. 3691.)

M. Ellemeetii (Ellemeet's). *fl.* rose-colour, rather small. Stems ovoid, depressed, ten-ribbed; ribs separated by broad sinuses; spines seven or eight, rather short, similar. Bahia, Brazil, 1872.

M. Schlumbergerianus (Schlumberger's). This species forms a globular, glaucescent, furrowed mass, about 6in. in diameter, and as much in height; the angles are fifteen in number, elevated about 1in., and bear clusters of about nine radiating spines, which are white, with black points; the terminating tuft, or cap, is about 1in. high and 2in. broad. St. Thomas' Island, 1861.

MELODINUS (from *melon*, an apple, and *dineo*, to turn round; referring to the shape of the fruit). SYNS. *Bicorona*, *Lycimnia*. ORD. *Apocynaceæ*. A genus comprising about fifteen species of woody-stemmed, often climbing, stove shrubs, natives of the East Indies, South China, the Malay Archipelago, the Islands of the Pacific, and tropical Australia. Flowers white, often fragrant, disposed in short terminal cymes; corolla with a cylindrical tube, and five oblique or sickle-shaped, spreading lobes; the mouth of the tube furnished with a coronet composed of five to ten small erect scales. Fruit a globose two-celled berry, pulpy inside. Leaves opposite, penniveined. The only species yet introduced is the one here described. For culture, *see* **Dipladenia.**

M. monogynus (one-styled). *fl.* white, fragrant; panicles axillary and terminal, sub-globular, brachiate, crowded. July. *fr.* yellow, four-cornered, the size of an orange, containing an edible pulp. *l.* lanceolate, shining, acuminated Northern and Eastern India, 1820. (B. M. 2527; B. R. 834.)

MELOLONTHA VULGARIS. *See* **Cockchafers.**

MELON (*Cucumis Melo*). The Melon produces the richest and most highly valued fruit of any plant in the family to which it belongs, and its crop is one of the most important each year for dessert and other purposes. It is supposed to be a native of the hotter parts of Asia, and to have been introduced from there to Europe at the commencement of the Christian era. In some parts of the East, where Melons grow plentifully in the open air, the fruit forms one of the chief articles of food for the inhabitants. In this country, where success is rarely attainable without glass houses, or frames, and artificial heat, the product is, in consequence, one of comparative luxury. The Melon is a trailing plant, unless trained to cover trellises, &c., when, by the use of its numerous tendrils in retaining a hold, it becomes partially self-supporting as a climber it is of annual duration. The flowers are monœcious, and are produced in the axils of the leaf-stalks (see Fig. 540), the males being by far the most numerous of the two sexes. Plants only succeed well during the summer, when there is plenty of light and sun for ripening the fruits, and causing them to attain the highest flavour. The season for the best fruits is, therefore, limited to the six months beginning with May; and, for the earliest crops, preparations must commence in January, or early in February. It is advisable to sow a few seeds, from this time until July, at intervals of about three weeks, as various circumstances may tend to render one or more batches useless, and then others will be ready to take their place in a short time afterwards. Melons are raised in any quantity, from seeds, and it is very important that these should be obtained from a reliable source. Where numerous varieties, or even any number beyond one, are grown together, there is a danger of the flowers becoming naturally or artificially cross-fertilised; and, again, if good specimens of fruit are not selected for seed-bearing, deterioration soon takes place. The seeds are best placed singly, or two each, in small pots, with a view, in the latter instance, of removing the weakest plant in due course. A compost of loam and leaf soil is most suitable, and the pots should be plunged in a frame where there is a bottom heat of about 75deg. Considerable attention is requisite in the early part of the year, in respect of inuring young plants to air and light, with a view to getting them strong before being permanently planted. So soon as the first leaf appears, beyond those produced by the seed, the plants are generally fit for repotting. This operation should be carefully performed, to avoid injuring the tender roots, and the soil, before being used, should, for the same reason, be placed where it can become warm throughout. Allowing seedling Melons to become starved in their pots, before planting, is a bad system, unfortunately too commonly practised. It is far better to sow frequently, and plant only such as are healthy, and in a free-growing state, discarding others as soon as it is known they will not be required.

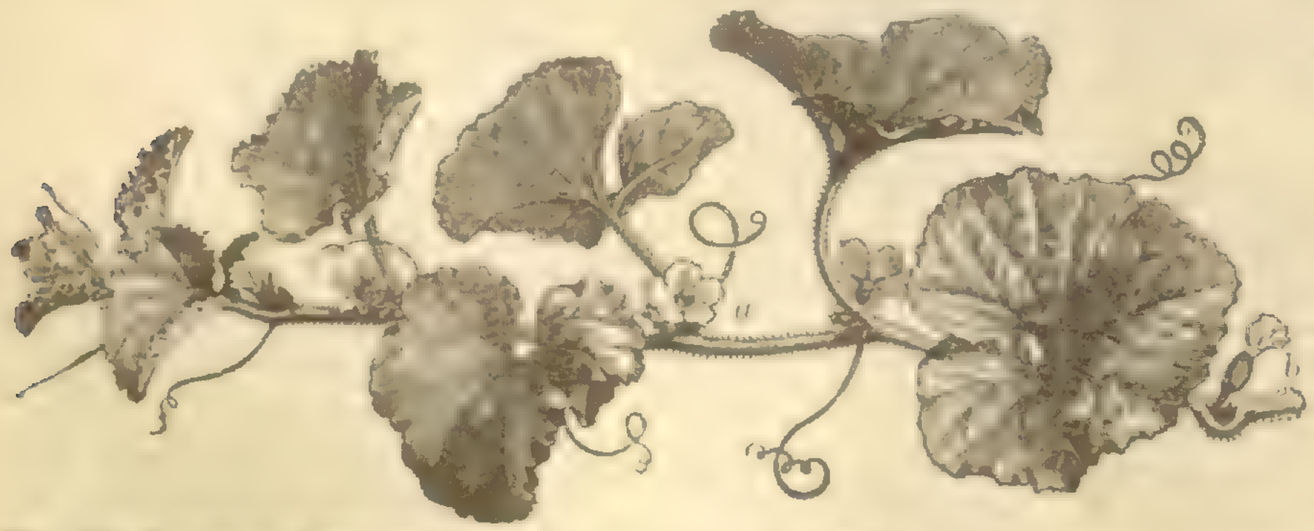

FIG. 540. LATERAL GROWTH OF MELON, showing (*a*) Male and (*b*) Female Flowers.

Soil. Melons succeed best in a rather strong, heavy loam, which should be of a friable, rather than of an adhesive, nature. Some growers recommend cutting turf, 3in. thick, from a pasture, breaking it in pieces, and using at once; while the more general plan, in gardens, is, perhaps, that of reserving a small stack purposely for growing Melons and a few other plants, such as pot Strawberries, which require similar heavy soil. A little well-rotted manure is sometimes added, but it should only be sparingly applied, or the soil may become too rich, and induce an over-luxuriant growth. The better plan is to give manure water after a crop of fruit is set, or to substitute a richer compost as a top-dressing, if an additional one is required, at the same period. The soil for Melons should be rammed very firm before planting time, or when an addition is made round their roots. It matters little how hard the bulk is made; roots readily permeate the whole, if kept quite moist, as it should be—at least, till the fruits begin to ripen.

Melon—*continued.*

Culture in Frames. Where a quantity of Melons have to be supplied, and houses suited for their culture are not obtainable, the ordinary pits and frames have, of necessity, to be utilised for growing them. In summer, this is not difficult, especially with some of the hardier sorts; but, in spring, there are many disadvantages in not being able to attend to the plants without having them exposed to the air. Pits for Melon culture may or may not be heated by hot water; in either case, the bottom heat is usually supplied by fermenting material, into which the roots are allowed to extend. This, and the soil, should be prepared, and put in a few days before the plants are inserted, in order that rank steam may escape, and everything become warmed to a suitable temperature. Some soil should be incorporated with the dung on the surface, and small mounds of soil alone made where it is intended to plant—say, under the centre of each sash, if there is sufficient space between for the plants to develop. In training Melon plants in frames, the points should be pinched out when the second or third rough leaf is expanded. Two branches will then proceed from the axils of the lower leaves; one should be trained towards the front, and the other towards the back of the frame. When these extremities are nearly reached, pinch out the points again, and fruiting laterals will be those next produced. The chief aim will then be to get enough flowers fertilised to eventually form a crop. This process, called "setting," is generally performed artificially, when the weather is fine, and plenty of air can be admitted. It consists in transferring dry pollen from the anthers of the male to the stigma of the female flowers, when both are in a fully expanded state. The operation may be performed by means of a camel's-hair pencil, or by detaching a male flower, removing its corolla, and applying the pollen direct. It is best to allow only one fruit on a lateral; if more are set, they should be removed. When any commence swelling with certainty, the lateral on which they are growing should be stopped at the point, and a piece of slate, or board, placed beneath each fruit, to keep it clean. The sub-lateral growths made afterwards must be kept somewhat thinned, so as to admit the sun and light necessary for perfecting the fruit.

Cultivation in Houses. Although large numbers of Melons are grown successfully in frames, superior accommodation, in every way, is afforded in houses, the plants being fully under control for receiving the necessary attention. Houses used in winter for forcing or plant-growing, may be utilised throughout the spring and summer for Melons, if special provision cannot be made. For early supplies, small lean-to or half-span houses, about 10ft. wide, and facing south, are best adapted; and an ample supply of heat should be at command. Melons succeed much better with than without bottom heat. It is sometimes supplied by pipes fixed in the bed beneath where they are planted out; and, at others, by fermenting material placed to the depth of 2ft. or 3ft. Where pipes are in use, they should be surrounded with clinkers, or other material, through which the heat may pass readily to the soil in which the Melons are grown. This should be placed in mounds, not less than 4ft. apart, near the centre of the bed, and allowed to remain until thoroughly warmed through. The plants, having been previously prepared in pots, and not allowed to become starved, or infested with insects, may then be inserted, one in the middle of each mound, the collar being kept a little above the surface, and the soil pressed firmly round the roots. A trellis must be provided, about 1ft. from the glass, if one is not already fixed, and a stake placed at once to each plant, to prevent it getting broken. The training of Melons is differently practised in houses to what it is in frames. The main shoot is encouraged to

Melon—*continued.*

grow nearly to the top of the trellis before being stopped. Side shoots, which then appear from the axil of nearly every leaf on the main stem, invariably bear female blossoms, and it is advisable, before any are fertilised, to wait until a sufficient number of these open at one time to form the crop. When one or two fruits are allowed to take the lead, they swell rapidly, and later ones frequently turn yellow, and drop off. About six fruits will be enough for plants occupying the space above given, and, if this number can be successfully fertilised about the same time, they will each have a good chance of swelling. A support must be placed beneath each fruit before it becomes very heavy, to prevent it breaking down, or, when getting ripe, becoming detached from the stalk, and falling. A small board, with a string or wire secured to each corner, for tying to the trellis, is a handy method much practised, the boards being equally useful for several fruits. Ripening will be indicated by the fruit parting from its stalk, changing colour, and emitting a strong perfume, not before observable. It may then be cut, laid for a time in the sun, and afterwards in a cool, airy fruit-room, until required for use. The period during which a Melon is at its best is a short one, and it is very important to know from experience, as near as possible, when this period is, and to send the fruit for dessert at the right time. Hastening or retarding the ripening process, to supply at certain dates, may be accomplished by exposing to a higher or lower temperature, which, in either case, should be a somewhat dry one.

Some growers cultivate Melons, in summer, on what is called the extension system, and many of the free-growing varieties succeed admirably when thus treated. A large house, in which the air is warmed by hot-water pipes, and the bed heated similarly, or with fermenting material, is planted with Melons in the usual way, or at greater distances apart, the object being to allow a less number of plants to grow without much restriction, and keep on producing fruits. Thus, if three plants are inserted, the centre one may be cropped and removed, and the others allowed to occupy the space afterwards; or the two permanent ones only may be inserted at first. Under this system, it will be necessary to have additional soil supplied, to keep the plants growing. Watering, so far as is requisite, must be continued, and air admitted more freely when successional fruits are being fertilised. It would be well for the inexperienced to try this plan before generally adopting it, as the treatment of plants respecting the ventilation, watering, and other details, must, of course, be different where the same house contains fruits in the several stages of flowering, swelling, and ripening. The advantage claimed is the larger, more juicy, and highly-flavoured fruit, because obtained from plants whose sap is allowed free circulation, consequent on less restriction being practised in training the branches.

Shading and Temperature. Seeds of Melons, when sown in pots, should be plunged in a bottom heat of about 75deg., either inside a dung frame or in a heated house. In the early part of the year, the young plants must be very carefully treated, by gradually exposing them to light before there is a possibility of their getting drawn. Later on in the season, as the days lengthen, they grow more strongly from the first. A light shading should be temporarily applied in hot weather, to prevent flagging; but Melons bear a good deal of sun without injury, if properly watered and ventilated. The temperature of the Melon house or pit, in spring, may be from 60deg. to 65deg. by night, with a rise of 10deg. by day. Air must be very cautiously admitted during March and April, and the house or pit shut up early on bright days, to take advantage of the sun heat. If the latter raises the temperature after

Melon—*continued.*

closing to 90deg., when the plants are growing, and there is plenty of moisture about, no harm will be likely to result. During the flowering period, more air must be admitted, and a drier atmosphere maintained. In summer, but little fire heat need be given, and none will be necessary, as a rule, during the latter part of June and in July. Plenty of air should be given early in the day when a great heat is expected.

Watering. Melons require abundance of water and frequent syringing when they are growing freely. Both must be regulated according to the time of year, and the amount of light and sun heat available. All the water used for both purposes should either be heated, or allowed to stand and become warmed to the temperature of the house. In frames, where there is a depth of manure into which the roots penetrate, watering need not be so frequently practised as in houses, where a comparatively small mound of soil is placed above hot-water pipes. When the plants are growing, and also after the fruits are set, water should be frequently thrown about the passages and round the walls of the house, unless the weather be dull and wet; but when flowering, and so soon as ripening commences, the air and soil must be kept drier, and the fruits in the later stages allowed exposure to the sun, which materially contributes to their good flavour.

Insects, &c. The most injurious insect commonly found on Melons is Red Spider, very few batches of plants escaping its attack altogether. It is important to start with a clean house or pit, and also to have plants free from such a troublesome pest. In the early stages of growth, the leaves may be examined separately, at frequent intervals, and if any insects are detected, they may be carefully sponged off. The leaves are, however, so brittle that this cannot readily be performed without injury. The best plan of removing the insect is to syringe with as much force as the leaves allow, using soft rain water, which has been standing in the house to become warmed. Melon leaves will not withstand the use of insecticides that are applied to many other plants. Green or Black Fly, if allowed a footing, increase rapidly; consequently, their appearance should be watched for, and the usual remedy of fumigating with tobacco smoke applied. Some caution in this performance is necessary, as the leaves may be easily injured thereby.

Melons not unfrequently damp off, just at the neck of the plant. It is considered that one great cause of this disease—if it really is one—is a close and over-moistened atmosphere. The remedy of constant ventilation, if only very slight, will naturally be suggested, and a little powdered lime and charcoal, applied when the first symptoms are seen, will often dry up the affected tissues, and prevent further injury. The stem and roots are also sometimes attacked by canker, which is not generally observable until the leaves give indications by flagging, and the plants die in a short time. A small nematoid worm, also, now and then, attacks the roots, living inside the tissues, and causing them to decay. The injured parts, or, better still, the whole plant and roots, should be burned, and the use of any part of the soil avoided for a future crop. Unhealthy plants, or those subjected to checks from improper airing, watering, or other causes, are most liable to canker; sturdy, free-growing ones are far less frequently attacked.

Sorts. There are few kinds of fruit amongst which natural or artificial cross-fertilisation is practised with greater ease for the production of new varieties, than amongst Melons; hence the appearance of such a numerous quantity of so-called new or improved sorts each year. A few of the old ones are only with difficulty surpassed; and a selection from those of recent years

Melon—*continued.*

presents a standard of excellence, on every point, which it is most desirable to maintain. Deterioration soon takes place, and good varieties may readily be lost by allowing their fruits to be cross-fertilised; consequently, it is well to keep raising some new ones, with a view of, at least, preserving a high standard, and, possibly, further improving it. A thin skin, quality, size, and productiveness, are the most important properties. If one or two sorts are found to suit in these particulars, they should be grown; others should only be admitted

FIG. 541. CANTALOUP MELON.

for experiment, unless proved to be superior. The Cantaloup Melon (see Fig. 541) is supposed to have been one of the first ever cultivated in Europe. It has a

FIG. 542. COULOMMIER'S MELON.

remarkably irregular surface, and both the skin and flesh are variable in colour. Coulommier's Melon (see Fig. 542) is only remarkable for its hardiness and the size of its

FIG. 543. EMBROIDERED MARKET MELON.

Melon—*continued.*

fruits; it is cultivated, almost without shelter, in the open fields in Normandy, &c. The Embroidered Market Melon (see Fig. 543), also a netted variety, bears a large nearly spherical fruit, with orange, or reddish-orange

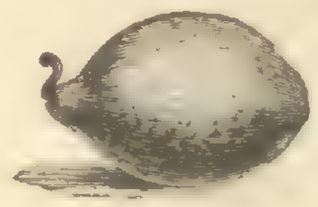

FIG. 544. FIGARI MELON.

flesh; the ribs are not prominent. The Figari (see Fig. 544) is an ornamental and small-fruited Melon, probably of African origin. Its obovoid fruits are scarcely as large as a medium-sized hen's egg; they are smooth and yellow when ripe, and exhale a very decided Melon odour, but are not edible, being only cultivated for

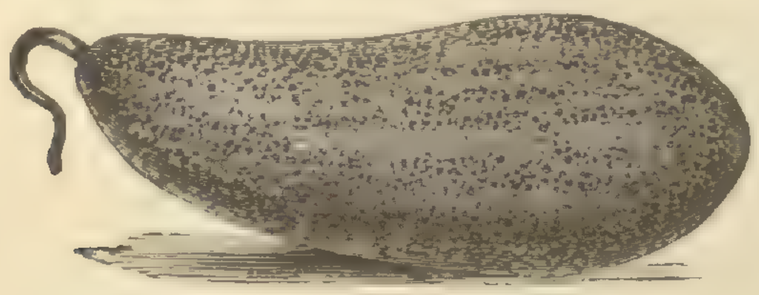

FIG. 545. PERSIAN MELON.

ornament, garnishing, &c. The Persian Melon (see Fig. 545) has elongated pear-shaped fruits, of medium size, without ribs, not, or only slightly, netted; the rind is yellow, marbled with dark green; the flesh is greenish-white, and very sugary; this sort keeps a long time.

FIG. 546. QUEEN ANNE'S POCKET, OR DUDAIM, MELON.

Queen Anne's Pocket, or Dudaim (see Fig. 546), does not differ markedly in foliage and habit from ordinary Melons, but its very small round fruits, marbled with brown on an orange or orange-red ground, distinguish it at once from all others; it is probably of African origin. The fruits, when ripe, have a very strong odour, but are not edible; they are only of use for garnishing and decorative purposes.

FIG. 547. WINTER MELON.

The Winter Melon (see Fig. 547) is the largest of the white-fleshed kinds, but is also one of the least desirable. The fruit is elliptic, more or less elongated, rarely subspherical, with a smooth or faintly netted skin, and thick flesh; it varies much in size and colour, the latter ranging from dark green to creamy-white or yellow. This sort is cultivated in open fields in the South of Europe.

Melon—*continued.*

Melons are usually divided into two, and sometimes into three, classes, according to the colour of their flesh inside the skin. For all practical purposes, the two under which the subjoined limited selection of varieties are classed, are amongst the best in cultivation. Doubtless, there are very many others considered of equal or superior merit, according to the views of different cultivators and consumers of the fruit.

Class I. Green and White-fleshed.

Cashmere (Meredith's). Fruit medium or large, oval, slightly ribbed; skin thin, yellow when ripe, not much netted, flesh nearly white, very juicy, and of excellent flavour. An old variety, but, when well grown, one of the best in cultivation.

Colston Bassett Seedling. Fruit slightly obovate; skin yellow, beautifully netted; flesh whitish, melting, very juicy.

Eastnor Castle. Fruit medium or large, from 3lb. to 4lb. in weight; skin pale yellow; flesh melting, and very rich. A free grower and bearer; one of the best, but does not keep long.

Gilbert's Green-fleshed. Fruit large, oval, greenish-yellow; flesh melting and juicy.

Golden Gem (Cox's). Fruit round, yellow, netted; flesh whitish-green, of good flavour.

Golden Queen. Fruit medium, round; skin thin, golden-yellow, beautifully netted; flesh very juicy. Plant of a hardy constitution.

Hero of Lockinge. Fruit medium; skin rich golden-yellow, with white lacing; flesh white, melting, of very fine flavour. An excellent variety, either for pits or houses.

Queen Emma. Flesh almost white, tender, and melting, with thin rind. A large, handsome, free-bearing variety, of strong constitution.

Victory of Bath (Gilbert's). Fruit large, slightly oval; skin greenish-yellow, not much netted; flesh green, juicy, and richly flavoured. Plant of moderate growth.

William Tillery. Fruit large, handsome; skin dark green, thin; flesh pale green, juicy, sweet, and of excellent quality. One of the best varieties if well grown.

Class II. Scarlet-fleshed.

Blenheim Orange. Fruit medium or large, and of excellent flavour. Plant of good constitution, and remarkably prolific; one of the best of this class.

Read's Scarlet-fleshed. Fruit medium size, beautifully netted, more oblong than Scarlet Gem; flesh solid, and of good quality. An old but excellent sort.

Scarlet Gem. Fruit nearly round, handsomely netted all over. A constant, free-bearing variety, of excellent flavour.

Scarlet Premier. Fruit handsome, slightly oval, highly coloured and beautifully netted; flesh solid, thick, having a delicate aroma.

MELON, MUSK. *See* **Cucurbita moschata.**

MELON THISTLE. *See* **Melocactus.**

MELON, WATER. *See* **Citrullus vulgaris.**

MEMBRANOUS, MEMBRANACEOUS. Having the texture of a membrane.

MEMECYLEÆ. A tribe of *Melastomaceæ*.

MEMECYLON (the Greek name used by Dioscorides for the fruit of the Arbutus). SYN. *Scutula*. ORD. *Melastomaceæ*. A genus consisting of about 100 species of very glabrous trees and shrubs, inhabiting Asia, Australia, the Pacific Islands, tropical Africa, and Ceylon, many being found on the seashores. Flowers white or bluish, frequently axillary, or springing from below the leaves, or terminal, fasciculate, or in panicles. Leaves sessile or shortly petiolate. Various dyes are extracted from some of the Cingalese species. *M. edule* has edible but astringent berries. The species are unknown to cultivation in this country.

MENINIA TURGIDA. A synonym of **Cystacanthus turgida** (which *see*).

MENISCIUM (from *meniskos*, a crescent; referring to the shape of the spores). ORD. *Filices*. A genus comprising ten species of very distinct stove ferns, almost confined to the tropics. Fronds simple or once pinnate. Sori oblong or linear, occupying the connivent transverse veinlets. The species generally do well

Meniscium—*continued.*

in a loamy soil, and should always be kept moist at the roots, without stagnation. For general culture, *see* **Ferns.**

M. angustifolium (narrow-fronded). *sti.* sub-tufted, 6in. to 18in. long, firm, erect, slightly pubescent. *fronds* 1½ft. to 2ft. long, 1ft. broad; pinnæ spreading, 4in. to 6in. long, ¼in. to ⅜in. broad, gradually narrowed to a long acuminate point, the edge sub-entire, the base cuneate, the lower ones often stalked; fertile pinnæ much narrower than the barren ones; rachis pubescent. *areolæ* four to six between the midrib and edge. West Indies to Peru.

M. giganteum (gigantic). *sti.* 1ft. long, dark brown, slightly pubescent. *fronds* simple, 1½ft. to 2ft. long, 4in. broad, elongate-oblong, narrowed rather suddenly at both ends, the edge slightly repand. *areolæ* thirty to forty between the midrib and edge. Peru. A rare species in cultivation.

M. palustre (marsh). A synonym of *M. serratum.*

M. reticulatum (netted). *sti.* tufted, 1ft. to 3ft. long, stout. *fronds* pinnate, 2ft. to 4ft. long, 1ft. or more broad; pinnæ 6in. to 12in. long, 1in. to 4in. broad, the apex acuminate, the edge entire or sub-repand, the base rounded or cuneate. *areolæ* eight to twelve between the midrib and edge. Mexico to Peru, 1793.

M. serratum (serrated). *sti.* 1ft. to 3ft. long, stout. *fronds* pinnate, 3ft. to 4ft. or more long, 1ft. or more broad; pinnæ 1in. to 3in. apart, 6in. to 12in. long, ½in. to 2in. broad, oblong-lanceolate, the base cordate or cuneate, the apex acuminate, the edge finely toothed. *areolæ* twelve to twenty between the midrib and edge. Mexico to Peru. SYN. *M. palustre.*

FIG. 548. MENISCIUM SIMPLEX.

M. simplex (simple). *rhiz.* firm, wide-creeping. *sti.* stramineous, of the barren fronds 4in. to 6in., of the fertile 1ft. or more, long. *fronds* simple; barren ones 6in. to 9in. long, 2in. to 3in. broad, oblong-lanceolate, acuminate, the base cordate, and sometimes auricled, the edge crenate; fertile ones similar but smaller. *areolæ* eight to twelve between the midrib and edge. Chusan, Hong Kong, &c., 1850. See Fig. 548.

M. Thwaitesii (Thwaites'). *rhiz.* firm, wide-creeping. *sti.* 9in. to 12in. long, sub-stramineous, nearly naked. *fronds* 8in. to 10in. long, 4in. to 5in. broad, sub-deltoid; the apex acuminate, crenato-pinnatifid; below this several blunt, linear-oblong, sub-entire pinnæ, lowest largest, distinctly stalked, 2in. to 3in. long, ¼in. broad, edge bluntly (not deeply) lobed; base narrowed suddenly. *areolæ* and *sori* four or five in the lower pinnæ between the midrib and edge. Ceylon.

M. triphyllum (three-leaved). *rhiz.* firm, wide-creeping. *sti.* slender, sub-stramineous, of the barren fronds 4in. to 6in., of the fertile fronds 1ft. or more, long. *fronds* with an oblong-lanceolate terminal pinna, 4in. to 5in. long, 1in. to 1¼in. broad, the base cuneate or rounded, the edge repand, and one or two similar but smaller ones on each side, the fertile ones smaller than the barren ones. *areolæ* six to nine between the midrib and edge. Himalayas, &c., 1820.

MENISPERMACEÆ. An order of trailing (rarely erect) shrubs, broadly dispersed through most tropical regions. It belongs to Lindley's menispermal alliance of diclinous exogens. Flowers dicœcious, small, in a panicle,

Menispermaceæ—*continued.*

raceme, or cyme, rarely solitary, sometimes accompanied by cordate bracts. Leaves alternate, exstipulate, usually palminerved, entire or palmilobed or peltate, rarely compound (as in *Burasaia*); petiole spuriously jointed at the base, and sometimes at the top. The bark of several species of this family is extremely bitter; some yield a yellow dye. Beer is sometimes adulterated in England with *Cocculus indicus*. There are about thirty-one genera and 300 species. Examples are: *Cissampelos*, *Cocculus*, and *Menispermum.*

MENISPERMUM (from *mene*, the moon, and *sperma*, a seed; in allusion to the shape of the seed). Moon Seed. ORD. *Menispermaceæ.* A genus comprising only two species of climbing deciduous shrubs, one of which is North American, and the other an inhabitant of Eastern Asia. Flowers greenish-white, small, paniculate. Drupe compressed. Leaves often sub-peltate, palmately lobed or angular. The under-mentioned species is a very handsome plant for damp and shady walls. Propagated by divisions of the root, or by cuttings, in spring.

M. canadense (Canadian). *fl.* yellowish, borne in profusion on long pendulous racemes. Summer. *l.* large, handsome, reniform, peltate. North America, 1691. (B. M. 1910.)

MENTHA (the old Latin name, borrowed from the Greek name *Minthe*). Mint. SYNS. *Audibertia* and *Pulegium.* ORD. *Labiatæ.* "... A natural genus, not numerous in species, but widely diffused over the greater part of the globe without the tropics, and most of the species, from the variety of situations to which they will adapt themselves, vary so much as to render their exact definition almost hopeless. Many of them also propagate so readily from suckers that individual specimens are perpetuated so as to assume the appearance of species. Almost all the species vary in the stamens" (Bentham). Whorls usually many-flowered, sometimes all remote in the axils of the leaves, sometimes approximate into terminal spikes, with the superior floral leaves bract-formed. Only a few of the species are worthy of cultivation. The dwarf evergreen kinds are readily increased by division of the plants in autumn and winter. For culture and uses of Spearmint and Peppermint, *see* **Mint.**

M. citrata (Citron-scented). Bergamot Mint. *fl.* reddish-purple, in round terminal heads. Summer. *l.* petiolate, ovate, broadly rounded at the base, or sub-cordate, glabrous. *h.* 1ft. Europe (Britain). SYN. *M. odorata.* (Sy. En. B. 1029.)

M. odorata (odorous). A synonym of *M. citrata.*

M. piperita (pepper). Peppermint. *fl.* purple; spikes loose, obtuse, short, interrupted at the base. Autumn. *l.* petiolate, ovate-oblong, acute, serrated, roundly crenated at the base, glabrous. Stem branched, reddish. *h.* 1ft. to 2ft. Europe (Britain). (B. M. Pl. 203.)

M. Pulegium (Pulegium). Pennyroyal. *fl.* pale purple; whorls all remote, globose, many-flowered. Autumn. *l.* petiolate, ovate. Stem much-branched, prostrate. Europe (Britain), North and West Asia, North Africa. (B. M. Pl. 201.) *See* **Pennyroyal.** The variety known as *M. P. gibraltarica* is largely employed in geometrical gardening. It has a dwarf, compact growth, and deep green foliage.

M. Requieni (Requien's). *fl.* pale purple, in loose, few-flowered whorls. Summer. *l.* petiolate, small, stalked, orbicular. Stems spreading at the base, much branched; branches filiform, ascending. Corsica, 1829. A pretty and minute creeping herb.

M. rotundifolia (round-leaved). *fl.* whitish, in dense, conically cylindrical spikes. Autumn. *l.* sessile, ovate-roundish, crenated, wrinkled, pubescently-hairy above, woolly beneath. Stem erect, panicled by a few branches at top. *h.* 1ft. to 2ft. Europe (Britain), North and West Asia, North Africa. (Sy. En. B. 1020.)

M. r. variegata (variegated). This variety is far more useful for horticultural purposes than the type. Its leaves are wrinkled on the upper surface, covered with a cobweb-like down underneath, and elegantly variegated with green and light yellow, which ultimately becomes darker.

M. viridis (green). Common Green Mint or Spearmint. *fl.* purplish; spikes cylindrical, loose; whorls approximate, or the lower ones or all distant. August. *l.* nearly sessile, ovate-lanceolate, unequally serrated, glabrous. Stem erect. *h.* 2ft. Europe (Britain). (B. M. Pl. 202.)

MENTZELIA (named after Christian Mentzel, 1622-1701, a German botanist). Including *Eucnide* and *Microsperma*. ORD. *Loaseæ*. A genus of hardy, annual, biennial, or perennial, herbaceous plants, found chiefly in Mexico, California, and the Southern United States. Flowers orange or white, solitary, racemose or cymose, opening only during sunshine. Leaves alternate or nearly opposite, coarsely toothed. For culture, &c., *see* **Bartonia** (which genus is now generally included under the present one).

FIG. 549. PORTION OF PLANT OF MENTZELIA BARTONIOIDES.

M. bartonioides (Bartonia-like).* *fl.* solitary, terminal; petals sulphur-yellow, paler, almost white beneath, ovate or rather obovate, slightly serrated, on long pedicels. Summer. *l.* ovate, acute, lobed and serrated. Stems about 1ft. long, flexuose, succulent, sub-translucent. Western United States, 1849. Annual. See Fig. 549. SYNS. *Eucnide bartonioides* and *Microsperma bartonioides* (B. M. 4491).

M. hispida (hairy). *fl.* yellow; petals obovate, mucronately acuminate, longer than the calyx; stamens numerous. June and July. *l.* nearly sessile. *h.* 1½ft. Mexico, 1820. Perennial. (B. M. 3205.)

Mentzelia—*continued.*

M. lævicaulis (smooth-stemmed). *fl.* bright yellow, from 2½in. to 3in. across, expanding only in the morning, and closing after noon. Summer. *h.* 2ft. California. Biennial.

M. oligosperma (few-seeded). *fl.* yellow; petals acuminate; peduncles axillary, solitary. May and June. *fr.* reflexed. Stem branched. *h.* 2ft. Louisiana, 1812. Perennial. (B. M. 1760.)

FIG. 550. UPPER PORTION OF PLANT OF MENTZELIA ORNATA.

M. ornata (adorned).* *fl.* white, large, odoriferous, expanding after sunset, and remaining closed up the whole of the day. July to September. Ovary leafy; seeds naked. *l.* hispid, glandular, laciniate. *h.* 2ft. Missouri, 1811. Annual. See Fig. 550. (B. M. 1487, under name of *Bartonia decapetala*.)

MENYANTHES (ancient name, from *men*, a month, and *anthos*, a flower; in allusion to the duration of the flower). Buckbean. ORD. *Gentianeæ*. A genus (two species) of very ornamental hardy perennial aquatics, natives of Arctic Europe, North Asia, North-west India, and North America. Flowers white or bluish, at the tops of the scapes, or in long, terminal, leafless, shortly racemose peduncles; corolla shortly funnel-shaped. Leaves alternate at base of stem, either trifoliolate or reniform, on long petioles, with scarious sheathing bases. Rootstocks long, thickish, creeping. The species are easily established, in shallow water or boggy situations, by divisions of the roots.

M. Crista-galli (cock's-comb). *fl.* in a simple or forked cyme; corolla white; tube not longer than the calyx; lobes naked, but with a medial crest. Spring. *l.* reniform, and sometimes emarginate, crenate, 2in. to 4in. wide; petioles and scape at length slender, and 1ft. to 2ft. high. North America. SYN. *Villarsia Crista-galli*.

M. trifoliata (three-leaved). Bogbean; common Buckbean; Marsh Trefoil. *fl.* white inside and reddish outside; anthers purplish, with the tips curved inwards; peduncles axillary. Spring. *l.* trifoliolate; leaflets ovate, obtuse. Stem procumbent, and covered by the sheaths of the leaves. Northern hemisphere (Britain). (Sy. En. B. 920.)

MENZIESIA (named after Archibald Menzies, 1754-1842, surgeon and naturalist to the expedition under Vancouver). ORD. *Ericaceæ*. A genus comprising seven species of hardy, Heath-like shrubs, natives of North America and Japan. Flowers white, greenish, or purple, in terminal corymbose fascicles, nodding or drooping; corolla cylindric-globose, urceolate or campanulate, obtusely four or five-lobed. Leaves alternate, petiolate,

Menziesia—*continued.*

obovate or elliptical, membranaceous, deciduous, entire, glabrous or pilose beneath. Branches sub-verticillate. The species are very ornamental subjects for rock gardens or borders, in a moist peaty soil. Propagated by carefully dividing established tufts, by cuttings, or by layers.

M. cærulea. *See* **Phyllodoce taxifolia.**

M. empetrifolia (Empetrum-leaved). A synonym of *Bryanthus empetriformis.*

M. ferruginea (rusty). *fl.* brown; corolla oblong-ovate, and becoming cylindrical; pedicels bristly-glandular. May. *l.* oblong or lanceolate-obovate, acutish at both ends, glandular-mucronate, rusty strigose-hirsute above, paler beneath. *h.* 6in. North America, 1811.

M. f. globularis (globular-flowered). *fl.* pink, drooping; corolla globose, with rounded lobes. May. *l.* ovate, clustered at the ends of the branches. *h.* 2ft. to 5ft. North America, 1806. (B. M. 1571, under name of *M. ferruginea* β.)

M. polifolia (Polium-leaved). A synonym of *Dabœcia polifolia.*

MERCURIALIS (so named after Mercury, who is supposed to have discovered some virtues in the genus). Mercury. ORD. *Euphorbiaceæ.* A genus comprising half-a-dozen erect herbaceous plants, with small, green, dicœcious flowers, and opposite leaves. They are uninteresting weeds, widely distributed over the temperate regions of the globe. *M. perennis*, the Dog's Mercury, a native of Europe and North Africa, is a poisonous plant, which turns dull bluish-green when dried; and a deep blue dye, of a fugitive nature, may be obtained from it.

MERCURY. *See* **Mercurialis.**

MERENDERA (a name given to *Colchicum* by the Spaniards). ORD. *Liliaceæ.* A genus comprising ten species of pretty, hardy, bulbous plants, inhabiting the Mediterranean region, and extending thence to Abyssinia and Afghanistan. They are closely allied to *Colchicum*, but the flattened portion of each of the six perianth segments is abruptly contracted into a long, narrow claw, and is, at the point of contraction, furnished on each side with a small tooth. For culture, *see* **Colchicum.**

M. Aitchisoni (Aitchison's). A synonym of *M. persica.*

M. Bulbocodium (Bulbocodium).* *fl.* one or two; perianth segments rosy-lilac, lanceolate, sub-acute; stamens much shorter than the perianth; anthers yellow. Autumn. *l.* three, emerging after the flowers, at length linear, falcate, channelled. *h.* 3in. to 4in. Pyrenees and the mountains of Spain (Sierra Nevada) in the alpine regions. SYN. *Colchicum montanum.*

M. caucasica (Caucasian). *fl.* one to three from the same spathe; perianth segments, with long narrow claws, which meet and form a tube; lamina delicate rose-coloured, tinged with purple. May. *l.* three, narrow-lanceolate, obtuse, channelled, much-tapering at the base, shorter than the flowers. *h.* 3in. Caucasus, 1823. (B. M. 3690.)

M. c. Eichleri (Eichler's). This differs from the type in the inner segments being distinctly auriculated at the base. Eastern Caucasus. (R. G. 952.)

M. persica (Persian). *fl.* pale lilac, fragrant, 1½in. to 2in. in diameter, funnel-shaped; keel of perianth segments pale reddish. November. *l.* 1in. to 2in. long, ⅛in. broad, acute, concave, dark green, rather fleshy, lengthening to 6in. or 8in. Corm 1½in. long, flagon-shaped, with a long neck; tunic pale chestnut-brown. India, Persia, &c., 1872. (B. M. 6012, under name of *M. Aitchisoni.*)

MERIANIA (named in honour of a Dutch lady, Sibylle de Merian, 1647-1717, authoress of "De Metamorphosibus Insectorum Surinamensium"). SYN. *Davya.* ORD. *Melastomaceæ.* A genus comprising about twenty-six species of erect, glabrous or pubescent, stove trees or shrubs, natives of tropical America and the West Indies. Flowers yellow or purple, large, disposed in short, cymose, terminal or lateral panicles; calyx glabrous or powdery, tube shortly campanulate or hemispherical; stamens ten, equal or nearly so. Leaves often on long petioles, oblong-lanceolate, obtusely acuminate or caudate at apex, three to five-nerved, entire or obtusely toothed. For culture, *see* **Melastoma.**

M. Karstenii (Karsten's). *fl.* deep red. Summer. *l.* lanceolate, serrate, long-acuminate. Branches terete, smooth. Caraccas, 1850. Shrub. (F. d. S. 767.)

Meriania—*continued.*

M. rosea (rosy).* *fl.* varying from white with a crimson base to rose and purple; calyx lobes subulate; anther spurs short, alternately conical and bi-tubercled. *l.* elliptical or ovate-lanceolate, the younger ones minutely serrate with glandular teeth. *h.* 30ft. West Indies, 1885. An arborescent shrub.

MERISTOSTIGMA. A synonym of **Lapeyrousia** (which *see*).

MERODON CLAVIPES. *See* **Narcissus Fly.**

MERTENSIA (named in honour of Professor Francis Charles Mertens, 1764-1831, a German botanist). SYNS. *Casselia*, *Hippoglossum*, *Oreocharis*, and *Steenhammera.* ORD. *Borragineæ.* This genus comprises about fifteen species of very handsome, hardy, perennial, glabrous or pilose herbs, natives of Eastern Europe, extra-tropical Asia, and North America. Flowers blue or purplish, pedicellate, ebracteate; racemes terminal, or cymes loosely branched, few-flowered, unilateral, sometimes paniculate. Leaves alternate, often pellucid-dotted. The species are of very easy culture in ordinary garden soil; they form admirable subjects for mixed borders, copses, and rockwork. Propagated by divisions in autumn; or by seeds, sown as soon as ripe.

M. alpina (alpine).* *fl.* light blue, disposed in close, or at length loose, clusters, of which each stem bears from one to three. Spring and summer. *l.* bluish-green, oblong, somewhat spathulate or lanceolate, rather obtuse. *h.* 6in. to 10in. Rocky Mountains, 1875. A lovely little alpine.

M. alpina (alpine), of Hooker. A synonym of *M. lanceolata.*

FIG. 551. MERTENSIA DAHURICA, showing Habit and detached Flower.

M. dahurica (Dahurian). *fl.* bright azure-blue, drooping, in racemose panicles. June. *l.* ovate, roughish, slightly glaucous, and clothed with small decumbent hairs. Stems erect, branching, angular, furrowed, hairy. *h.* 6in. to 12in. Dahurica. A pretty species, with a very slender habit, and requiring a sheltered position. See Fig. 551. (B. M. 1743, under name of *Pulmonaria dahurica.*)

M. lanceolata (lanceolate).* *fl.* drooping; bracts leafy; calyx shorter than the corolla tube, five-cleft to the middle or lower; segments oblong and obtuse, or lanceolate and acute; corolla light or dark blue, with a cylindric tube; limb campanulate, very shortly five-lobed. May. *l.* sessile, chiefly cauline, linear-oblong or spathulate, radical often broader, acute or obtuse; upper surface smooth or muricate; margin ciliate. Stems simple, erect, slender. *h.* 6in. to 12in. Rocky Mountains, 1874. (B. M. 6178, under name of *M. alpina.*)

M. maritima (sea). Oyster Plant. *fl.* blue, erect, disposed in terminal corymbose racemes. July. *l.* ovate or oblong, acutish; the upper ones stem-clasping. Stems procumbent, branched. Northern coast regions of Northern hemisphere (Britain). SYN. *Pulmonaria maritima.* (Sy. En. B. 1099.)

M. paniculata (paniculate). *fl.* purplish-blue; corolla somewhat funnel-shaped, three or four times the length of the lanceolate-linear acute divisions of the calyx. July. *l.* ovate and ovate-lanceolate, taper-pointed, ribbed, thin. *h.* 1ft. to 2ft. North America. Plant erect, roughish, more or less hairy. (B. M. 2680 and B. R. 146, under name of *Pulmonaria paniculata.*)

M. sibirica (Siberian).* *fl.* purplish-blue, terminal, pedicellate, disposed in elongated, conjugate racemes, with a flower in the fork. May to July. *l.* rather fleshy, glabrous; radical ones cordate, roundish-obtuse, or broad-elliptic; cauline ones ovate,

Mertensia—*continued.*

acute. Stems erect, simple. *h.* 6in. to 18in. East Asia and North America, 1801. A very pretty species, varying in the colour of its flowers. SYN. *Pulmonaria sibirica.* There is a white-flowered form in cultivation.

FIG. 552. INFLORESCENCE AND DETACHED FLOWER OF MERTENSIA VIRGINICA.

M. virginica (Virginian).* Virginian Cowslip. *fl.* purple-blue, tubular, about 1in. long, disposed in gracefully-drooping terminal clusters. Spring and summer. *l.* lanceolate-ovate, lower ones 4in. to 6in. long, 2in. to 3in. broad, shortly stalked. *h.* 1ft. to 2ft. Virginia, 1799. See Fig. 552. (B. M. 160, under name of *Pulmonaria virginica.*)

MERTENSIA (of Willdenow). Included under *Gleichenia.*

MERULIUS LACRYMANS. This is often called the Dry-rot Fungus. It is the most frequent cause, though not the only one, of the form of decay in the woodwork of houses and of greenhouses commonly known as Dry-rot. The wood is traversed in every direction by the thread-like cells (mycelium) of the fungus; and the tissue is thereby so altered in its nature as to crumble readily on pressure. *Merulius* attracts moisture, and is constantly damp. It spreads over large surfaces in dark, ill-ventilated spaces, when in the spore-producing stage, and its surface (hymenium) is then marked with pores, or small tubes.

Remedies. The remedies employed for the attacks of this fungus (which, if unchecked, proves most destructive in houses, as it spreads rapidly) are, where possible, soaking the woodwork with strong solutions of corrosive sublimate, or of copper sulphate. Since well-dried or seasoned wood is far less liable to be attacked, such wood alone should be used in house-building. Good ventilation, to insure the dryness of the woodwork in the house, is an essential means for the prevention of Dry-rot.

MERYTA (said to be derived from *meryo*, to roll up; in reference to the male flowers forming something like a rolled-up ball). SYN. *Botryodendron.* ORD. *Araliaceæ.* A genus comprising six species of stove or greenhouse, glabrous trees, natives of Norfolk Island, New Zealand, and the South Pacific Islands. Flowers dicœcious, in panicled heads, at the sides of the branches, or in sessile fascicles; males small; females large. Leaves simple, large, entire or sinuated. For culture, *see* **Aralia.**

M. latifolia (broad-leaved). *fl.* greenish-yellow, male, female, and hermaphrodite, densely crowded into oblong compound heads, which are 2in. to 3in. long, formed of innumerable clusters of about six sessile flowers, on a thick green rachis. March. *l.* 2ft. to 3ft. long, crowded, narrow-obovate or fiddle-shaped; petiole short, stout. *h.* 50ft. to 60ft. Norfolk Island. Greenhouse. (B. M. 5932.)

M. sonchifolia (Sonchus-leaved). *l.* lyrate-pinnatisect; terminal lobe deltoid or somewhat acuminate; side lobes rhomboid-ovate, acute; margins irregularly toothed, dark green, marked with numerous whitish spots. Stem (and petioles) olive-green. New Caledonia, 1879. Stove. (I. H. 1879, 340.)

MESEMBRYANTHEMUM (from *mesembria*, midday, and *anthemon*, a flower: in reference to the flowers opening better on sunny days). Fig Marigold. ORD. *Ficoideæ.* A very extensive genus (about 300 species) of greenhouse, or rarely hardy, erect or prostrate, fleshy, leafy herbs or sub-shrubs, mostly natives of South Africa, a few being found in other parts of Africa, and in Australia, New Zealand, the Canary Islands, the Mediterranean region, and Arabia. Flowers white, yellow, or different shades of red, &c., conspicuous, axillary or terminal, cymose, paniculate, or corymbose; calyx tube adnate with the ovary; lobes five, rarely one to eight, unequal, herbaceous or scariose; petals many, one to many-seriate, inserted in the calyx tube, linear. Capsules tightly closed during dry weather, and opening naturally after rain (if placed in water until thoroughly soaked, and then removed, an old capsule will open out its carpellary valves, radiating from the centre, like a star, and will close them again when dry; this may be repeated several times without destroying its remarkable hygroscopic property). Leaves often opposite, thick, fleshy, very variable in shape, entire or furnished with spiny rigid hairs on the margins. The culture of most species of this genus is very simple, the great secret of success consisting in exposing the plants to the full sun at all times, and in not using too rich a soil. A compost of lime rubbish, yellow loam, sand, and decayed manure, in equal proportions, suits them well. Several species constitute very charming plants for window gardening, and many others can be grown with great success in the open from May until October. Propagation may be easily effected by pieces, pulled or cut off, and laid in the sun on moist sand, where they root freely in a few weeks. Except where otherwise stated, greenhouse treatment is required for the species here described.

FIG. 553. BRANCH AND DETACHED LEAF OF MESEMBRYANTHEMUM ACINACIFORME.

M. acinaciforme (scimitar-formed). *fl.* reddish, large, solitary, terminal. August. *l.* opposite, compressed, triquetrous, acinaciform, rather curled at the edges, and roughish. Stem rather procumbent, long. 1714. Evergreen trailer. SYN. *M. rubrocinctum.* See Fig. 553. (A. B. R. 508; B. M. 5539; M. A. S. § 19, Fig. 6.)

M. adscendens (ascending). *fl.* yellow, pedunculate. August. *l.* broadly tongue-shaped, very blunt, ascending, green. 1805. Plant stemless, herbaceous. (M. A. S. § 8, Fig. 4.)

M. agninum (lamb-chop). *fl.* yellow, sessile, solitary, central, expanding in the evening. May. *l.* semi-terete, serrulated from elevated dots, and hence somewhat toothed, with a large white pustule on the inside at the base. 1824. Plant almost stemless, canescent, wrinkled from dots, herbaceous. (M. A. S. § 5, Fig. 8.)

M. albidum (white-leaved). *fl.* golden-yellow, large, agreeably scented. June to August. *l.* greenish-white, subulate, triquetrous; apex obtuse, mucronate. *h.* 6in. 1714. Evergreen shrub. (B. M. 1824.)

M. albinatum (white-marked). *fl.* yellow, central, solitary, sessile. September. *l.* acinaciformly triquetrous upwards, with a recurved mucrone, full of scattered, rather elevated, whitish dots. *h.* 2in. 1823. Herbaceous.

Mesembryanthemum—*continued.*

M. aurantiacum (orange-coloured). *fl.* deep orange-colour, large, solitary. June to August. *l.* bluntly triquetrous, somewhat compressed, very glaucous; bracts semi-terete. Stem erect. *h.* 1ft. to 2ft. 1793. Shrub. (M. A. S. § 25, Fig. 2.)

M. aureum (golden). *fl.* bright orange, with yellow stamens and dark purplish pistils. February to May. *l.* cylindric-triquetrous, glaucous. *h.* 1ft. 1750. An upright evergreen shrub. (B. M. 262.)

M. australe (Southern). *fl.* pale pink, middle-sized; peduncles bluntly two-edged, bibracteate at the base. July. *l.* triquetrous, glaucescent, dotted, smooth, incurved. Stems semi-terete, creeping, shrubby. Australia, 1773. Evergreen. (M. A. S. § 18, Fig. 2.)

M. barbatum (bearded). *fl.* flesh-coloured; tubercles five, dark green within the flower. June to August. *l.* rather remote, spreading, ending in five or six radiating hairs at the apex. Stems erect; branches effusely procumbent. *h.* 6in. to 9in. 1705. Evergreen shrub. SYN. *M. stelligerum.* (B. M. 70; M. A. S. § 52, Fig. 1.)

M. bicolor (two-coloured). A synonym of *M. coccineum.*

M. blandum (charming).* *fl.* at first white, but at length pale rose or red, large; peduncles equal, longer than the bracts. June. *l.* compressed, triquetrous, crowded, narrow, acutish, smooth. Stems shrubby; branches numerous, compressed, ascending. *h.* 1ft. 1810. Evergreen. (B. R. 582; M. A. S. § 26, Fig. 1.)

M. Bolusii (Bolus'). *fl.*, petals yellow in their lower half, red in the upper, numerous, spreading over the tops of the plant. *l.* two, large, fleshy, trigonous, keeled, truncate, pale glaucous-green, dotted with dark green. 1883. (B. M. 6664.)

M. candens (glittering).* *fl.* white, terminal, solitary. June to August. *l.* cylindrical, incurved, canescent, glittering, obtuse. Branches long, weak, procumbent or prostrate. 1814. Evergreen trailer. (M. A. S. § 51, Fig. 4.)

M. caninum (dog). *fl.* yellowish-orange, opening after midday; peduncles longer than the leaves. August to October. *l.* glaucous, carinately-triquetrous, rather club-shaped, incurved towards the apex, and, as well as the bracts, somewhat toothed. 1717. Plant almost stemless, herbaceous. (M. A. S. § 5, Fig. 9.)

M. caulescens (caulescent). *fl.* red, fragrant, numerous, aggregate, small. May to July. *l.* much-crowded, glaucous, rather long, triquetrously deltoid, with the sides hardly toothed, and the keel entire. Stems erect, branched. *h.* 1½ft. 1731. Shrub. (M. A. S. § 30, Fig. 1.)

FIG. 554. MESEMBRYANTHEMUM COCCINEUM, showing Habit, detached Flower, and Portion of Branch, with Leaves.

M. coccineum (scarlet).* *fl.* scarlet, solitary; peduncles smooth at the base. May to September. *l.* teretely triquetrous, rather compressed, obtuse, glaucescent. Stems shrubby, erect. 1696. See Fig. 554. (L. B. C. 1033; M. A. S. § 46, Fig. 1; B. M. 59, under name of *M. bicolor.*)

M. conspicuum (conspicuous).* *fl.* of a beautiful red, peduncular. Autumn. *l.* green, glittering in sunshine, triquetrous, and as well as the branches, crowded. Floriferous stems erect. *h.* 1ft. 1806. Shrub. (M. A. S. § 27, Fig. 1.)

M. Cooperi (Cooper's).* *fl.* handsome purple, solitary, about 2in. in diameter. *l.* terete, glaucous, pointed, studded with papillæ. *h.* 3in. 1 oz. A much-branched decumbent herb. (B. M. 6312.)

M. corallifiorum (coral-flowered). *fl.* pink, solitary, showy. May. *l.* nearly terete, incurved, smooth, rather thicker in the middle, glaucous. Stems straight, much-branched. *h.* 1ft. 1820. Shrub. (M. A. S. § 40, Fig. 2.)

M. cordifolium (cordate-leaved). *fl.* red, solitary, terminal, or rather lateral, on the elongated branches. May to September. *l.* opposite, flat, petiolate, ovate-cordate, rather papulose. Stems

Mesembryanthemum—*continued.*

suffruticose, diffuse. 1774. Annual or biennial. (M. A. S. § 61, Fig. 1.) Dc. Pl. Succ. 101

M. c. variegatum (variegated).* *fl.* bright rosy-purple, sessile. *l.* flat, fleshy, small, cordate, distinctly margined with cream-colour. A very handsome little perennial; it forms a diffuse yellowish mass, entirely covering the surface of the ground, and is largely employed in bedding-out designs.

FIG. 555. MESEMBRYANTHEMUM CRINIFLORUM.

M. crinifiorum (hairy-flowered), *fl.* pedunculate; petals purple, paler on the outside; stamens very short; calyx lobes five, unequal, larger ones oblong and contracted in the middle. July. *l.* opposite, cuneiform, flat, obtuse, rather scabrous from papulæ. Stems short, branched from the base, herbaceous. *h.* 6in. 1774. See Fig. 555. SYN. *M. cuneifolium.*

M. cruciatum (cross-leaved). *fl.* yellow, large, solitary; peduncles two-edged, 1in. to 2in. long. May to November. *l.* linear-tongue-shaped, semi-cylindrical, very soft, cruciate. 1792. Plant nearly stemless; old stems 3in. high. Herbaceous. (M. A. S. § 7, Fig. 7.)

M. crystallinum (crystalline).* Ice Plant. *fl.* white, axillary, almost sessile. May to August. *l.* ovate, sessile, alternate, stem-clasping, undulated. 1775. Plant diffusely procumbent, herbaceous, covered with large glittering papulæ on every part, which makes the plant appear as if covered with ice. Hardy annual. This species is sometimes grown for garnishing purposes. It is a most effective plant for the rockwork, and thrives in any moderately good soil, and in a sunny situation. Seeds should be sown in gentle heat, during March, and the seedlings planted out in the open in June.

M. cultratum (cultrate). *fl.* of a shining yellow above, and reddish beneath, large, solitary; peduncles compressed, rather longer than the flowers. Autumn. *l.* distichous, tongue-shaped, cultrate at the margin and apex, 3in. to 4in. long. *h.* 6in. 1820. Plant almost stemless, herbaceous. (M. A. S. § 8, Fig. 5.)

Mesembryanthemum—*continued.*

M. cuneifolium (wedge-shape-leaved). A synonym of *M. crinifiorum.*

M. curtum (short-sheathed). *fl.* white, terminal, sub-paniculate. June. *l.* connate and sheathing at the base, usually approximate, incurved, smooth, green, with the angles rough at the top. Stem erect, bushy. *h.* 1ft. to 1½ft. Shrub. (M. A. S. § 36, Fig. 6.)

M. curvifolium (curved-leaved). *fl.* white, or ultimately rose, large; peduncles clavate, length of bracts. June. *l.* compressed, triquetrous, glaucescent. Stem shrubby; branches robust, terete. *h.* 2ft. to 3ft. 1818. Closely allied to *M. blandum.* (M. A. S. § 47, Fig. 2.)

FIG 556. FLOWERING BRANCH OF MESEMBRYANTHEMUM DELTOIDES.

M. deltoides (deltoid). *fl.* rose-coloured, sweet-scented, ternate or cymose. Summer. *l.* incurvate, erect, glaucous, trifariously toothed. An erect, shrubby species, with reddish-brown branches. See Fig. 556.

FIG. 557. MESEMBRYANTHEMUM DENSUM.

M. densum (dense).* *fl.* pink; peduncles hispid; calycine leaflets almost equal, twice as short as the petals. June. *l.* semi-cylindric, crowded with prickles at the apices. *h.* 3in. 1732. Evergreen trailer See Fig. 557. (B. M. 1220.)

M. depressum (depressed). *fl.* yellow, large, solitary, sessile. September. *l.* pale, narrow-tongue-shaped, obtuse, recurved, depressed, variously incurved at the apex. *h.* 1½ft. 1795. Plant almost stemless, prostrate, herbaceous. (M. A. S. § 8, Fig. 7.)

Mesembryanthemum—*continued.*

M. diversifolium (diverse-leaved). *fl.* yellowish-brown, striated by a red line on the outside, pedunculate. May. *l.* very long, triquetrously semi-cylindrical, rather recurved, green, crowded in heads. Stems prostrate, rather nodose; adult ones robust, angular, red and yellow. 1726. Shrubby. (M. A. S. § 15, Fig. 2.)

M. dolabriforme (hatchet-shaped). *fl.* yellow, fully expanding in the evening and night only. June. *l.* somewhat resembling a hatchet in shape, dotted. *h.* 6in. 1705. A free-flowering evergreen. (B. M. 32.)

M. echinatum (hedgehog). *fl.* yellow. August. *l.* oblong-ovate, filled; rather triquetrous, gibbous, ramentaceously echinated. Stems erect, branched. *h.* 3in. to 6in. 1774. Shrub. (M. A. S. § 53, Fig. 2.)

M. edule (edible).* Hottentot Fig. *fl.* yellow, large, solitary, terminal. July. *l.* equally triquetrous, dotless, a little channelled, attenuated at both ends, with the keel serrulated. Branches expanded, with quite entire angles. 1690. This prostrate shrub is nearly hardy in dry, sunny spots in the southern counties.

M. elegans (elegant). *fl.* reddish, pedunculate, middle-sized. May to October. *l.* rather triquetrous, very glaucous, scabrous. Stems suffruticose; branches decumbent, white. 1724. Shrub. SYN. *M. retroflexum.*

M. emarginatum (emarginate). *fl.* pale red, solitary; peduncles bibracteate. June *l.* triquetrous, scabrous, glaucescent. Stems suffruticose; branches expanded, filiform. *h.* 1ft. to 2ft. 1732. (M. A. S. § 48, Fig. 4.)

M. ermininum (ermine). *fl.* yellow, solitary, terminal, opening in the evening. May. *l.* triquetrous, wrinkled from large dots; margins with short teeth at the apex. *h.* 1½in. 1824. Plant almost stemless, glaucous. A densely-tufted herb. (M. A. S. § 5, Fig. 6.)

M. falciforme (sickle-shaped). *fl.* pink, terminal, solitary or ternate, expanding at midday, fragrant, pedunculate. *l.* in clusters, thick, falcate, acinaciform, glaucous, large-dotted. Stems sub-erect, flexuose, woody, rigid. *h.* 1½ft. 1805. Evergreen shrub. (M. A. S. § 29, Fig. 1.)

M. fastigiatum (fastigiate). *fl.* of a fulvous colour on the outside, whiter and paler on the inside, solitary, middle-sized. July to September. *l.* crowded, flexuously reflexed, subulate, semi-terete, glaucescent. Stems slender, erect at first, but at length becoming decumbent. *h.* 1ft. 1794. Shrub. (M. A. S. § 44, Fig. 3.)

M. felinum (cat). *fl.* yellow, expanding after midday, sessile, solitary. August to November. *l.* 1½in. long, ciliated, with long teeth, obsoletely dotted, cartilaginously keeled at the apex, full of pellucid dots when examined by the light. 1730. Plant stemless, glaucescent, herbaceous. (M. A. S. § 5, Fig. 2.)

M. floribundum (bundle-flowered).* *fl.* pale red, with the petals white at the base, numerous, expanding before midday. May to October. *l.* almost cylindrical, somewhat incurved, papulose, obtuse. Stems suffruticose, bushy; branches spreading, very numerous. *h.* 6in. 1704. (M. A. S. § 51, Fig. 7.)

M. formosum (beautiful).* *fl.* purplish (filaments white), terminal.

Mesembryanthemum—*continued.*

disposed by threes, pedunculate. August. *l.* triquetrous, long, green, glittering in sunshine, much-crowded, but more remote on the branches. Stems suffruticose, dwarf. *h.* 1ft. 1820. (M. A. S. § 27, Fig. 4.)

M. fragrans (fragrant). *fl.* yellow, 3in. in diameter, fragrant, solitary, on a short peduncle. August. *l.* tongue-shaped, thick, one side rather convex and obtuse at the apex, the other side thrown out into a keel. *h.* 6in. Plant almost stemless, herbaceous. (M. A. S. § 8, Fig. 2.)

M. geminiflorum (twin-flowered). *fl.* pale pink, small, terminal. April and May. *l.* erect, spreading, triquetrous, glaucous, smooth, cartilaginous at the margins. Stems suffruticose, dwarf; branchlets dichotomous, ascending. *h.* 1ft. 1792. Evergreen.

M. glaucinum (bluish-grey). A synonym of *M. mutabile*.

M. grandiflorum (large-flowered). *fl.* yellow, almost scentless, large, sessile. July. *l.* broad tongue-shaped, long, thick, having a large pustule on the inside at the base. *h.* 3in. 1824. Plant herbaceous. (M. A. S. § 8, Fig. 3.)

M. hirtum (hairy). *fl.* of a bright purple, about 1½in. in diameter, terminal, usually solitary, sometimes two or three together. Summer. *l.* connate at base, sub-erect, recurving, linear, attenuate, both surfaces covered with minute glistening papillæ. Stems diffuse, procumbent, terete. *h.* 3in. 1862. Herbaceous. (G. C. n. s., x. p. 138.)

M. imbricans (imbricating). *fl.* red, pedunculate. May to October. *l.* linear, obsoletely triquetrous, smoothish, of a whitish-glaucous colour, imbricately crowded at the top of the canescent branches. Stems erect, shrubby. 1818.

M. imbricatum (imbricated). A synonym of *M. multiflorum*.

M. inclaudens (never-closing).* *fl.* purplish-pink, scentless, always open; inner petals somewhat imbricated. June. *l.* dolabriform, green, tipped with red. Branches red. *h.* 1½ft. 1805. Evergreen shrub. The flowers of this plant are useful for cutting purposes, as they will last for several days. (A. B. R. 384.)

M. introrsum (introrse). *fl.* on long, slender, terminal peduncles; calyx tube turbinately hemispheric, obscurely obtusely angled, green; limb of five spreading and recurved segments; petals in two series, very various in colour, white, fading to rose, or ochreous or red. *l.* in distant pairs, somewhat recurved, semi-terete, with very rounded sides, tipped with brown bristles, connate at base, light green, fleshy. Stems branched from the base. South Africa, 1824. (B. M. 6057.)

FIG. 558. MESEMBRYANTHEMUM LINGUÆFORME.

M. linguæforme (tongue-formed). *fl.* yellow, solitary, on very short peduncles. March to November. *l.* unequally tongue-shaped, thick, green, keeled on one side. *h.* 6in. 1732. Plant stemless, herbaceous. See Fig. 558. (M. A. S. § 8, Fig. 8.)

M. lupinum (wolf). *fl.* yellow; petals two or three-seriate. Summer. *l.* glaucescent; marginal ciliæ very long and numerous. Plant stemless. Very closely allied to, and perhaps only a variety of, *M. trimum*. (M. A. S. § 5, Fig. 3.)

M. micans (glittering). *fl.* usually brownish-scarlet, with a golden-yellow centre, but varying in colour, pedunculate, 1½in. in diameter. July and August. *l.* sub-cylindric, and, as well as the flower stalks, covered with conspicuous glittering particles. Stem erect. *h.* 2ft. to 3ft. 1704. Evergreen shrub. (B. M. 448.)

Mesembryanthemum—*continued.*

M. microphyllum (small-leaved). *fl.* reddish, small, solitary, on short peduncles. May. *l.* connate, triquetrous, acuminated, a little awned, green, dotted, pustulate on the inside at the base. Stems short, densely branched, decumbent. 1795. Shrub. (M. A. S. § 34, Fig. 2.)

M. minimum (smallest). *fl.* very pale yellow, almost white, solitary, sessile, central. September to December. *h.* ½in. 1776. Plant stemless, obconical, glaucescent, herbaceous, with confluent, rather branched, spots.

FIG. 559. MESEMBRYANTHEMUM MINUTUM.

M. minutum (minute).* *fl.* long, tubular; petals pale yellow in the free part, spreading; tube slender, ½in. long. September to November. 1795. Plant stemless, obconical, glaucous, hardly the size of a common bean, and without spots. Evergreen shrub. See Fig. 559. (B. M. 1376.)

M. molle (soft). *fl.* pale red, small, solitary, terminal. October. *l.* spreading, turgidly triquetrous, firm, canescent, the margins blunt, and lined with dots. Branches crowded, two-edged, decumbent. *h.* 1ft. 1774. Evergreen.

M. multiflorum (many-flowered).* *fl.* white, panicled, numerous, nearly 1in. in diameter; peduncles bracteate even to the calyx. July. *l.* connate and sheathing at the base, glaucous, remote, smooth, dotted, rather compressed, triquetrous. Stems and branches erect, sub-tetragonal. *h.* 2ft. to 3ft. 1792. Shrub. SYN. *M. imbricatum*. (M. A. S. § 37, Fig. 1.) There are three or four varieties of this species, including *minus*, *nitens*, and *patens*.

M. muricatum (muricated). *fl.* red, numerous, aggregate, small, fragrant. May. *l.* crowded, deltoid, glaucous, and, as well as the bracts and lobes of calyx, trifariously denticulated. Stem erect, branched. *h.* 1½ft. 1731. Shrub. (M. A. S. § 30, Fig. 3.)

M. murinum (mouse). *fl.* yellow, small, solitary, sessile. September. *l.* ciliately denticulated, three rows on each side, and full of tubercular dots, with the margin and keel ciliately denticulated at the apex. *h.* 1½in. 1790. Plant almost stemless, glaucous, herbaceous. (M. A. S. § 5, Fig. 4.)

FIG. 560. LEAFY SHOOT AND INFLORESCENCE OF MESEMBRYANTHEMUM MUTABILE.

Mesembryanthemum—*continued.*

M. mutabile (changeable). *fl.* reddish, solitary, on short pedicels. July to September. *l.* nearly distinct, crowded, triquetrous, dotted, with a cartilaginous, entire keel. Stems shrubby, erect, branched, two-edged. *h.* 1½ft. 1792. Shrub. SYN. *M. glaucinum.* See Fig. 560. (M. A. S. § 21, Fig. 3.)

M. nobile (noble). *fl.* yellow, scentless, large, sessile, opening before midday, bibracteate at the base. July. *l.* coarsely and triquetrously clavate, obtuse, somewhat recurved, rather concave above, marked by large elevated tubercles. *h.* 1½in. 1822. Plant rather caulescent, herbaceous. (M. A. S. § 4, Fig. 1.)

M. obcordellum (reversed-heart-shaped). *fl.* whitish, small, sessile. June. *h.* 1½in. 1794. Plant stemless, obconical, glaucescent, with confluent branched dots. Evergreen shrub. (B. M. 1647.)

M. octophyllum (eight-leaved). A synonym of *M. testiculatum.*

M. patulum (spreading). *fl.* pale red, solitary, pedunculate. June. *l.* compressed, triquetrous, very glaucous, attenuated at both ends, acinaciform. Stems suffruticose, erect. *h.* 1½ft. There are several varieties of this species.

M. polyanthum (many-flowered). *fl.* pale red, small, very numerous, panicled. August. *l.* small, glaucous, triquetrous, scabrous. Branches flexuous, crowded; bark on young stems rufous. *h.* 1ft. to 1½ft. 1803. Shrub.

M. polyphyllum (many-leaved). A synonym of *M. violaceum.*

FIG. 561. MESEMBRYANTHEMUM POMERIDIANUM, showing Habit and detached Flower.

M. pomeridianum (afternoon). *fl.* yellow, large, expanding after midday, solitary, on axillary, very long, hairy peduncles. July. *l.* broad-lanceolate, flat, smooth, ciliated, nearly distinct. Stems hairy, terete, branched. *h.* 1ft. 1774. A very pretty hardy annual. See Fig. 561. (B. M. 540; M. A. S. § 65, Fig. 1.)

M. pugioniforme (dagger-formed). *fl.* pale yellow, large; peduncles bracteate. July to September. *l.* alternate, crowded at the tips of the branches, glaucous, triquetrous. Stems erectish, suffruticose; branches few, terete, decumbent. *h.* 1ft. 1714. Shrub. See Fig. 562. (M. A. S. § 16, Fig. 4.)

M. purpureo-album (purple and white).* *fl.* showy; petals white, polished, naked, with a broad dark purple line; peduncles filiform. August. *l.* green, triquetrously semi-cylindrical, full of little dots; upper ones crowded. Branches short, angular, prostrate, furrowed, yellowish. 1824. Shrub. (M. A. S. § 15, Fig. 3.)

M. retroflexum (reflexed). A synonym of *M. elegans.*

M. Rossii (Ross'). *fl.* white at base, deep purple above, solitary, terminal, large, showy. Summer. *l.* acinaciform, or compressedly triquetrous, glaucescent, with red, smooth, cartilaginous edges. Stems decumbently prostrate. 1820. Shrub. (M. A. S. § 19, Fig. 2.)

M. rostratum (beaked). *fl.* yellow, expanding in the sun, solitary, pedunculate; bracts two, longer than the scape. *h.* 3in. 1742. Plant stemless, herbaceous. (M. A. S. § 3, Fig. 7.)

M. rubrocinctum (red-girded). A synonym of *M. acinaciforme.*

M. Salmii (Salm-Dyck's). *fl.* yellow, large, sessile. September to November. *l.* decussate, semi-cylindrical, attenuate and acute at the apex, or oblique and bluntish. *h.* 6in. 1820. Plant nearly stemless, herbaceous. (M. A. S. § 7, Fig. 8.)

M. serratulum (serrate). *fl.* yellow, with purple lines, ternately disposed, solitary. November and December. *l.* sub-connate, triquetrous, subulate, elongate, dotted, serrated at the angles or only at the keel, and rather glaucous, usually longer than the internodes, with the margins minutely serrulated, but hardly cartilaginous. Stems shrubby, when young erect; branches erectly decumbent. 1795.

M. setuliferum (bristly). *fl.* bright violaceous, solitary in the forkings of the branches; peduncle slender, 1½in. to 2in. long. June. *l.* usually rather distant, sub-cylindrical, blunt, covered with setuliferous papillæ, ending in a tuft of from seven to sixteen flexuose, white, radiating hairs. Stems branching diffusely; branches procumbent, 1ft. or more long. 1876. Shrub.

FIG. 562. MESEMBRYANTHEMUM PUGIONIFORME, showing Flowering Branch and Immature Capsule.

M. spectabile (showy).* *fl.* of a beautiful red, 2in. in diameter, May to August. *l.* glaucous, triquetrous, and, as well as the branches, crowded. [illegible] dwarf: floriferous ones ascending or erect. *h.* 1ft. 1787. Shrub. (B. M. 396; M. A. S. § 20, Fig. 3.)

M. stelligerum [illegible] A synonym of *M. barbatum.*

M. stipulaceum (stipuled). *fl.* light red, paler on the under side, 2in. in diameter, solitary. May. *l.* teretely triquetrous, long, subulate, [illegible] the base. Stems shrubby, [illegible] *h.* 1ft. 1723. (M. A. S. § 40, Fig. 3.)

M. striatum [illegible]. *fl.* reddish, with a deeper-coloured line in the middle, expanding before noon; peduncles hispid. May to October. *l.* semi-cylindrical, subulate, papulose. Stems erect. *h.* 9in. 1727. Shrub. (M. A. S. § 51, Fig. 1.)

M. subulatum [illegible] *fl.* petals white, with a purple [illegible] rib, solitary, pedicellate. June. *l.* rather [illegible] subulate, denticulated at the apex. Stems branched. Plant herbaceous.

M. sulcatum (furrowed). *fl.* white, spotted with rose, middle-sized, solitary. August. *l.* crowded, linear-subulate, semi-terete.

Mesembryanthemum *-continued.*

channelled, pale green, adult ones expanded. Stems shrubby, erect. *h.* 2ft. 1819. (M. A. S. § 44, Fig. 1.)

M. Sutherlandi (Sutherland's). *fl.* lilac, with a yellow centre, 2in. to 2½in. broad. Summer. *l.* oblong-lanceolate, recurved, scaberulous at the edge. *h.* 3in. 1870. (B. M. 6299.)

M. tenuifolium (slender-leaved). *fl.* copper-red, solitary; peduncles elongated, naked. June to September. *l.* semi-terete, rather compressed, subulate, green, glabrous, longer than the internodes. Stems shrubby, erectish. *h.* 1ft. 1700. (M. A. S. § 46, Fig. 6.)

FIG. 563. MESEMBRYANTHEMUM TESTICULATUM.

M. testiculatum (testiculated). *fl.* yellow, nearly 1in. in diameter; calyx six-cleft, with two leaf-bracts at base. November. *l.* six to eight, white, smooth, rather erect, convex beneath, flat above. *h.* 1½in. 1819. Plant stemless, shrubby. SYN. *M. octophyllum*. See Fig. 563. (B. M. 1573.)

FIG. 564. MESEMBRYANTHEMUM TIGRINUM.

M. tigrinum (tiger). *fl.* yellow, expanding after noon, large, central, sessile. September to November. *l.* stem-clasping, ovate-cordate, expanded, marbled with white, flat above, ciliated with long hairs, cartilaginously keeled at the apex. *h.* 3in. 1790. Plant stemless, greenish, herbaceous. See Fig. 564. (B. R. 260; M. A. S. § 5, Fig. 1.)

M. tricolorum (three-coloured).* *fl.* large, shining, pedunculate; petals straw-coloured, blood-coloured at the base. April. *l.* exactly cylindrical, acute, green. Stems prostrate; branches distant. 1794. Shrub. See Fig. 565. (M. A. S. § 15, Fig. 7.)

M. truncatellum (truncate). *fl.* solitary, sessile; calyx tube sunk and tightly wedged between the two uppermost leaves, the limb five or six-cleft, the lobes obtuse, tinged purple; petals straw-coloured, in two series; stamens numerous; anthers yellow. October. *l.* very fleshy, broadly cuneate, connate to above the middle; back and face convex; crown lunate, brown, mottled, convex. *fr.* Plant forming tufts of pale glaucous-green, obconic, truncate, translucent, fleshy masses. (B. M. 6077.)

Mesembryanthemum *continued.*

M. uncinatum (hooked-leaved). *fl.* red, middle-sized, solitary. August. *l.* connate, and sheathing at the base, rather decurrent, green, dotted, triquetrous, furnished with two spines underneath at the apex. Stems shrubby, erect. *h.* 1ft. to 2ft. 1725. (M. A. S. § 33, Fig. 3.)

M. vaginatum (sheathed). *fl.* white, small, panicled, numerous. July. *l.* spreading, straight, remote, triquetrous, rather recurved at the apex, and, as well as the sheaths, green and glabrous, but with the angles rough near the top. Stems erect, bushy. *h.* 1½ft. 1882. Shrub. (M. A. S. § 36, Fig. 4.)

M. variabile (variable). *fl.* yellow, at length becoming reddish, solitary, pedunculate, expanding in the morning. July. *l.* somewhat triquetrous, compressed, glaucous, scabrous. Stems shrubby, effuse, rather decumbent. *h.* 1½ft. 1796. (M. A. S. § 46, Fig. 2.)

FIG. 565. MESEMBRYANTHEMUM TRICOLORUM, showing Habit, and Unopened and Fully-expanded Flowers.

M. violaceum (violaceous).* *fl.* flesh-coloured to violet, expanding in the heat of the sun; peduncles one-flowered, naked or bracteate at the very base. June to October. *l.* triquetrously semi-terete, rough from dots, acute, glaucous. Stems shrubby, erect; branches violaceous, expanded. *h.* 1ft. to 2ft. 1820. SYN. *M. polyphyllum*. (M. A. S. § 48, Fig. 3.)

M. viridiflorum (green-flowered). *fl.* greenish; petals very narrow; calyx hairy. July to November. *l.* semi-terete, beset with papulose hairs. Branches diffuse. *h.* 1ft. to 2ft. 1774. Shrub. (B. M. 326.)

M. vittatum (striped). *fl.* bright shining yellow, paler on the back, with a narrow red line down the centre on both sides; peduncle one-flowered, bibracteate at the base. November. *l.* connate at the base, erect, lanceolate, acute, mucronate. Plant sub-acaulescent, cæspitose, forming dense tufts, 1½in. to 2in. high. 1877.

MESEMBRYEÆ. A tribe of *Ficoideæ*.

MESOCHLÆNA. Included under *Didymochlæna*.

MESOCLASTES. A synonym of **Luisia** (which *see*).

MESOSPINIDIUM. Now included, by Bentham and Hooker, under **Odontoglossum** (which *see*).

MESPILUS (from the old Greek name *Mespilos*, used by Theophrastus). Medlar. ORD. *Rosaceæ*. A small genus of hardy deciduous trees, now included, by Bentham and Hooker, under *Pyrus*. Flowers large, nearly sessile usually solitary; petals nearly orbicular. Pome turbinate, open, five-celled. Leaves undivided, shortly stalked, lanceolate or oblong, slightly toothed or lobed. For culture, &c., *see* **Medlar.**

M. acuminata (acuminate). A synonym of *Cotoneaster acuminata*.

M. Amelanchier (Amelanchier). A synonym of *Amelanchier vulgaris*. Frequently met with in gardens under the name of Snowy Mespilus.

M. Cotoneaster (Cotoneaster). A synonym of *Cotoneaster vulgaris*.

Mespilus—*continued.*

FIG. 566. FRUITING BRANCH OF MESPILUS GERMANICA.

M. germanica (German).* Common Medlar. *fl.* white, solitary. May. *l.* lanceolate, undivided, a little downy, but most so underneath. *h.* 10ft. to 20ft. Europe (Britain), Asia Minor, Persia. See Fig. 566. (Sy. En. B. 478.) There are several varieties of this species. *See* **Medlar.**

M. grandiflora (large-flowered). A synonym of *M. Smithii.*

M. parvifolia (small-leaved). A synonym of *Crataegus parvifolia.*

M. Smithii (Smith's).* *fl.* white, usually solitary, one-half the size of those of the common Medlar. May and June. *l.* oblong-elliptic, serrated, pubescent on the nerves beneath; stipules of the sterile branches large and foliaceous. *h.* 20ft. Caucasus. SYN. *M. grandiflora* (S. E. B. 18).

MESUA (named after two celebrated Arabian physicians and botanists, Mesue, who flourished at Damascus in the eighth and ninth centuries). ORD. *Guttiferæ.* A small genus (about half-a-dozen species) of stove evergreen shrubs or trees, natives of tropical Asia. Flowers large, axillary, solitary. Leaves narrow, very slender, crowded, elegantly marked with numerous parallel veins, diverging from the midribs. The undermentioned species thrives in a loam and peat compost. Propagated by cuttings of half-ripened shoots, placed in sand, with slight bottom heat, in May; or by seeds, sown in heat, during March or April.

M. ferrea (iron-wooded). *fl.* white, about the size of those of the Sweetbriar, very fragrant, stalked, axillary. July and August. *l.* elliptical-lanceolate, acute, glaucous beneath. *h.* 40ft. India, 1837. An exceedingly ornamental hard-wooded tree, the deep yellow stamens contrasting finely with the white corolla.

METAXYA. Included under *Cyathea.*

METHONICA. A synonym of **Gloriosa** (which *see*).

METRODOREA (named after Metrodorus, a painter, who, according to Pliny, was the first to illustrate plants by figures). ORD. *Rutaceæ.* A monotypic genus, the species being a stove shrub, thriving best in a compost of loam and peat. Propagated by cuttings, placed under a bell glass, in heat.

M. atropurpurea (dark purple). *fl.* purplish, glandular, small, borne on panicles. *l.* opposite, entire, stalked, dotted. *h.* 5ft. Brazil, 1851. The proper name of this plant is, according to Bentham and Hooker's classification, *Esenbeckia atropurpurea.* (F. d. S. 337.)

METROSIDEROS (from *metra*, the heart of a tree, and *sideros*, iron; referring to the hardness of the wood). Ironwood. ORD. *Myrtaceæ.* This genus comprises about eighteen species of greenhouse, evergreen, glabrous or hoary-tomentose, rarely scandent, trees or shrubs, inhabiting the Pacific Islands, from New Zealand to the Sandwich Isles, one being found in the Indian

Metrosideros—*continued.*

Archipelago, one in tropical Australia, and one in South Africa. Flowers often showy, in dense, di- or trichotomous, terminal or rarely axillary, cymes; calyx tube campanulate, funnel-shaped, or urceolate; segments five, loosely imbricated; petals five, spreading. Leaves opposite or some rarely alternate, penniveined. The undermentioned species are all from New Zealand. For culture, *see* **Melaleuca.**

M. buxifolia (Box-leaved). A synonym of *M. scandens.*

M. florida (flowery). A synonym of *M. robusta.*

M. robusta (robust). *fl.* red, disposed in a terminal thyrse. May. *l.* opposite, obovate-oblong, glabrous, veiny. *h.* 5ft. 1845. Shrub. (B. M. 4471, under name of *M. florida.*)

M. scandens (climbing).* *fl.* white, almost sessile. August. *l.* sessile, ovate, slightly hoary beneath. *h.* 4ft. or 5ft. in pots, but in its native forests climbing to the summits of the loftiest trees. 1845. (B. M. 4515, under name of *M. buxifolia.*)

M. speciosa (showy). A synonym of *Callistemon speciosus.*

M. tomentosa (tomentose).* *fl.* rich crimson, large, in terminal, many-flowered, lax or dense cymes, thickly pubescent. July. *l.* decussate, petiolate, 1in. to 3in. long, varying from linear-lanceolate to oblong or orbicular-oblong. *h.* 30ft. to 40ft. 1840. Tree. (B. M. 4488.

METROXYLON (from *metra*, the heart of a tree, and *xylon*, wood; in allusion to the large proportion of pith contained in the plant). SYN. *Sagus* (in part). ORD. *Palmeæ.* A genus comprising about half-a-dozen species of erect stove palms, natives of the Malayan Archipelago, New Guinea, and the Fiji Islands. Spadix large, loosely paniculate-branched; spathe coriaceous, aculeate; floriferous branchlets alternate, elongated, erect, recurved. Fruit ellipsoid or sub-globose, one-seeded. Leaves terminal, sub-erect, equally pinnatisect; segments opposite, linear-lanceolate, acuminate; the costa setose beneath; margins at base recurved. The sago of commerce is prepared from the trunks of *M. læve* and *M. Rumphii.* The species described below succeeds best in sandy loam, and requires a strong, moist heat. Propagation may be effected by seeds, or by suckers.

M. vitiense (Viti or Fiji). *l.* pinnate, with segments about 1in. broad; petiole, lower portion particularly, beset with scattered long slender prickles.

METTERNICHIA (named after an Austrian Prince Metternich, 1772-1859). ORD. *Solanaceæ.* A genus comprising only a couple of species of handsome, glabrous, stove, evergreen trees, in habit similar to *Brunfelsia*; one is a native of Brazil, and the other inhabits Columbia. Flowers showy, shortly pedicellate, solitary, or a few at the apices of the branches; calyx campanulate, four to six-fid; corolla funnel-shaped; limb five or six-lobed. Leaves entire, somewhat shining, scarcely coriaceous. For culture, *see* **Lisianthus.**

FIG. 567. MELUM ATHAMANTICUM, showing Habit and detached Fruit (see next page).

Metternichia—*continued.*

M. Principis (Prince Metternich-Winneburg's). *fl.* white, in terminal racemes; corolla funnel-shaped, with a limb of five equal segments. August. *l.* deep green. *h.* 3ft. Brazil, 1854. A neat and handsome compact-growing plant. (B. M. 4747.)

MEUM (from *Meon*, the old Greek name used by Dioscorides). Bawd-money. ORD. *Umbelliferæ*. A monotypic genus, the species being an elegant, hardy, aromatic, tufted, glabrous, perennial. It thrives in borders, on banks, and in the rock garden, in almost any ordinary soil. Propagated by divisions.

M. athamanticum (Athamanta-like).* Spignel. *fl.* white, in rather large, compound, terminal umbels; involucre, when present, of a few linear leaves, often altogether wanting. May. *fr.* narrow, but not beaked, with the primary ridges winged. *l.* much divided into numerous thread-like segments. Stems leafy, channelled, slightly branched. *h.* 1ft. to 2ft. Mountains of Western Europe (Britain). See Fig. 567, page 361. (Sy. En. B. 606.)

MEXICAN TEA. *See* **Chenopodium ambrosioides.**

MEXICAN THISTLE. A common name of *Cnicus conspicuus*.

MEXICAN TIGER FLOWER. *See* **Tigridia.**

MEYENIA (of Nees). Included under **Thunbergia** (which *see*).

MEYENIA (of Schlechtendal). Included under *Cestrum*.

MEZEREON. *See* **Daphne Mezereum.**

MICE. These animals are at times very troublesome in gardens, eating bulbs, roots, seeds, and the bark of trees; and occasionally they destroy numbers of trees by eating through or round the trunks, just below the surface of the ground. There are two kinds especially hurtful in gardens, viz., the Short-tailed Field Mouse, or Vole (*Arvicola arvalis*), and the Long-tailed Field Mouse (*Mus sylvaticus*). Both are very common, but the former prefers the drier, the latter the damper, places. They are readily distinguished by the tail, which, in the Vole, scarcely reaches one-fourth the length of the body, and is blunt at the tip; while the tail of the other is long, and tapers to the tip. The Vole has also a rounder head, with shorter ears, and its fur has a redder tinge than that of the Long-tailed Mouse. The Voles make runs among the grass of Lawns, &c., but they are not very easily caught. The most effective method of lessening their numbers has been found to be making pitfalls, 1ft. at least in depth, 4in. to 6in. wide at the mouth, and considerably wider at the bottom. Into these the Mice fall, and from them they cannot climb out. An inverted flower-pot sunk in the ground is sometimes used instead of the pit. Traps of various kinds may also be used, such as the Figure of 4 trap, or wire traps. The same means may be used to capture the other species, and poison may be employed with success where its use would not be dangerous to children or to domestic animals. One of the best poisons for Mice is phosphorus, made up with lard and flour. This may be scattered on the seed beds, or beside bulbs or other things that are endangered by the Mice. Other poisons employed for killing Mice are nux vomica or strychnine, arsenic, and white hellebore; but these are all dangerous to use for this purpose. Among natural enemies to Mice out of doors, owls, hawks, weasels, and their allies, are very helpful to gardeners, and should be protected by them whenever possible, whatever gamekeepers' views may be in regard to damage done by them among game. It is said that Mice may be prevented from proving injurious in seed beds by covering the soil, seedlings, and plants, with an inch of fine coal ashes. The mice, it is supposed, will not dig through this substance, which, at the same time, shelters the plants.

MICHAELMAS DAISY. *See* **Aster.**

MICHAUXIA (named after André Michaux, 1746-1802, a French botanist). ORD. *Campanulaceæ*. A small genus (four species have been described) of handsome hardy biennial plants, allied to *Campanula*, but having the recesses or sinuses of the calyx covered, and the leaves lyrate. Corolla rotate, with eight reflexed divisions. Leaves irregularly toothed or lobed, cauline few. Michauxias are very effective plants for borders, and thrive in warm, sheltered spots. Increased by sowing seeds, in April, on a warm, sunny border.

M. campanuloides (Campanula-like). *fl.* white, tinged with purple on the outside, drooping, scattered along the branches and stem, from the axils of the bracts. Summer. *l.* strigose, radical ones lanceolate, irregularly lobed; petioles margined and lobed. Stem branched at top. *h.* 3ft. to 8ft. Levant, 1787. (B. M. 219.)

M. lævigata (smooth).* *fl.* scattered along nearly the whole length of the stem, on short peduncles; calyx segments acute, at first erect, afterwards spreading at right angles; corolla white, much longer than the calyx, ten-parted; anthers yellow; pollen yellow. August. *l.* sprinkled on both sides with harsh, erect hairs, duplicate-dentate, coarsely-veined and reticulate; root leaves ovate; stem ones sessile. Stem 11ft. high, herbaceous, smooth, shining, upright, straight. North Persia, 1829. The whole plant yields, on the slightest injury, a quantity of milky juice. (B. M. 3128.)

MICHELIA (named after Pietro Antonio Michele, 1679-1737, a celebrated Florentine botanist). ORD. *Magnoliaceæ*. A genus comprising twelve species of stove evergreen trees, closely allied to *Magnolia*, natives of India and the islands of the Eastern Archipelago. Flowers axillary, solitary, or in one species terminal, usually smaller than in *Magnolia*. Michelias thrive in a compost of sandy loam and leaf mould. Propagated, in summer, by cuttings of half-ripened shoots, placed in sand, under a glass, in heat.

M. Champaca (Champaca). *fl.* yellow, large, not unlike a double Narcissus, sweet-scented throughout the day, but becoming rather fœtid at night; peduncles short, axillary, one-flowered; produced throughout the year. *l.* ovate-oblong, acuminated, acute at the base, with the ribs beneath, as well as the peduncles and spathes, silky. *h.* 30ft. to 40ft. India and Java, 1779.

M. lanuginosa (woolly). *fl.* pale yellow. Spring. *l.* drooping, elliptic-lanceolate, acuminate, bright green above, paler beneath. Himalayas, 1865. (B. M. 6179.)

MICONIA (named after D. Micon, a Spanish botanist). Including *Chitonia* (of Don), *Diplochita*, and *Tamonea*. ORD. *Melastomaceæ*. A vast genus (about 300 species) of stove polymorphous shrubs and trees, natives of tropical America and Asia. Flowers white, pink, red, purple, or yellow, in terminal, or rarely lateral, corymbose panicles, pedicellate or sessile; calyx glabrous, furfuraceous, tomentose, or rarely setose; tube often adherent with the ovary; petals four to eight, obovate or oblong, spreading or reflexed. Berry two or many-seeded. Leaves frequently petiolate, entire, denticulate or serrulate. A few of the species are cultivated for the sake of their foliage, those described below being the best known. For culture, *see* **Melastoma.**

M. flammea (flame-coloured).* *l.* very large, glossy, but rugose from the sunken veins, thin-ribbed, elliptic, acuminate, with the blade partially decurrent on the petiole. Stem erect, clothed with close rusty hairs. A handsome foliage plant.

M. Hookeriana (Hooker's).* *l.* deep olive-green, with broad silvery midrib, elliptic, rugose. A fine ornamental-leaved shrub. Peru. (B. M. 5411, under name of *M. pulverulenta*.)

M. H. trifasciata (three-banded). *fl.* white, small, in terminal panicles. *l.* elliptic, acute, with the three ribs silvery. Branches, leaves, and panicles velvety-tomentose. Eastern Peru.

M. pulverulenta (powdery). A synonym of *M. Hookeriana*.

M. Teysmanniana (Teysmann's). *l.* elliptic-ovate, five-nerved, metallic green. Malayan Archipelago, 1867. (R. G. 537.)

MICRANDRA. A synonym of **Hevea** (which *see*).

MICRANTHELLA. Included under **Pleroma** (which *see*).

MICROCACHRYS (from *mikros*, small, and *kachrys*, a cone; referring to the very small cones). ORD. *Coniferæ*. A monotypic genus. The species is a prostrate, much-branched, greenhouse evergreen shrub, confined to the mountains of Tasmania. For culture, see **Dacrydium.**

Microcachrys—*continued.*

FIG. 568. FRUITING BRANCH OF MICROCACHRYS TETRAGONA.

M. tetragona (four-sided).* Strawberry-fruited Cypress of Tasmania. *l.* deep green, ovate, extremely small, in four rows, closely imbricated. Tasmania, 1857. The "Gardener's Chronicle" describes this species as quite a gem among conifers. The female plant is very pretty, having nearly every one of its multitude of little branchlets terminated by a bright red, almost globular, fleshy cone, measuring about ¼in. from base to apex. By training up a leader, the lateral branches arrange themselves in a drooping manner round about. SYN. *Dacrydium tetragonum*. See Fig. 568. (B. M. 5576.)

MICROCALIA. A synonym of **Lagenophora** (which *see*).

MICROGASTER. A genus of parasitic insects belonging to the *Braconidæ*, a family of Ichneumons, very rich in species. They are all of small size, seldom exceeding ⅛in. in length, and ¼in. in spread of wings. The body-colours are almost always black, red, or yellow; the legs are usually paler, at times almost white. The ovipositor is usually short, and is often hardly visible. The wings are transparent, and show few cross-veins and cells. Some of the *Braconidæ* in the larval state live in the bodies of aphides; others live in the bodies of caterpillars of butterflies and of moths. To this latter group belongs the genus *Microgaster*. The most noticeable species is *M. glomeratus*, which is very helpful to gardeners, because of the number of caterpillars of the White Cabbage Butterfly it destroys. The larvæ live on the fat of the caterpillars, usually many in each individual; and, till full fed, they do not seem greatly to interfere with the growth of their hosts, as they do not attack any vital organs of the latter. But, when mature, the parasitic larvæ eat their way through the skin of their hosts, and each proceeds to spin a small oval, yellow, silken cocoon. These cocoons are frequently grouped in masses of nearly 1in. across, on the dying or dead caterpillars, and must have often been observed by every gardener. The perfect flies have the body deep black, with very short, white hairs; the belly and legs yellow; and the four wings transparent, and covered with short hairs. *See also* **Ichneumon Flies.**

Microgaster—*continued.*

MICROGLOSSA (from *mikros*, small, and *glossa*, a tongue; alluding to the shortness of the straps of the ray-flowers). SYN. *Frivaldia*. ORD. *Compositæ*. This genus comprises about six species of shrubs, inhabiting, for the most part, the warmer regions of Asia and Africa. Flower-heads small; disk pale-coloured; ray white or pale blue. Leaves alternate, ovate or lanceolate, entire. *M. albescens*, probably the only species yet introduced, is a hardy shrubby perennial, thriving in almost any soil. Propagated by seeds, or by division of the roots.

M. albescens (whitish).* *fl.-heads* pale blue or whitish, Aster-like, small, numerous, in terminal corymbs. *l.* alternate, lanceolate, acuminate. Himalayas, 1883. A very handsome and floriferous plant. SYN. *Aster albescens*. (B. M. 6672.)

MICROGONIUM. *See* **Trichomanes.**

MICROGRAMME. *See* **Polypodium.**

MICROLEPIA. Included under **Davallia** (which *see*).

MICROLICIA (from *mikros*, small, and *olikos*, in general; in allusion to the generally dwarf habit of the plants). ORD. *Melastomaceæ*. A genus consisting of a large number of species (of which seventy-seven are regarded, by Bentham and Hooker, as distinct) of small erect stove shrubs. Flowers solitary, axillary, or at the tips of the branchlets, sessile or shortly pedunculate; calyx lobes five; petals obovate. Leaves small, often imbricated, entire, serrated, or crenulated, often gland-dotted. The species have little or no horticultural value.

MICROLOMA (from *mikros*, small, and *loma*, a fringe; in reference to the fascicles of hairs in the tube of the corolla). ORD. *Asclepiadeæ*. A genus comprising about five species of greenhouse evergreen twining sub-shrubs, natives of the Cape of Good Hope. Flowers red, in interpetiolar umbels; corolla urceolate, with a ventricose angular tube, a naked throat, and a short limb. Leaves opposite, often narrow. For culture, *see* **Ceropegia.**

M. lineare (linear). *fl.* blood-coloured; limb of corolla very blunt. July. *l.* linear, glabrous, with reflexed margins. 1823.

M. sagittatum (sagittate). *fl.* scarlet; limb of corolla very blunt. July. *l.* sagittate, sub-tomentose, linear-hastate, shortly petiolate; margins reflexed. 1775.

MICROMERIA (from *mikros*, small, and *meris*, a part; referring to the usually diminutive flowers). SYNS. *Piperella*, *Sabbatia* (of Moench), and *Tendana*. ORD. *Labiatæ*. A genus comprising about sixty species of hardy or half-hardy sub-shrubs or herbs, dispersed over nearly all the temperate and warmer parts of the globe, but occurring in the greatest abundance in the Mediterranean region. Flowers purplish or white, generally small; whorls axillary or spicate, rarely cyme-formed, sub-panicled. Leaves opposite. With few exceptions, the species are of no horticultural value. *M. Piperella* is a pretty little rock plant. It thrives in any common garden soil, and may be increased by cuttings.

M. Piperella (Piperella).* *fl.*, fascicles few-flowered, the common peduncle nearly as long as the floral leaves; calyx tubular, pubescent, thirteen-ribbed; teeth subulate; throat hairy within; corolla pubescent, twice the length of the calyx. August to October. *l.* ovate, sometimes cordate at the base. *h.* 3in. South-west Europe. Half-hardy sub-shrub. (Fl. Mont. 32.)

MICROMYRTUS (from *mikros*, small, and *Myrtos*, Myrtle; small Myrtles). ORD. *Myrtaceæ*. A genus comprising six species of Heath-like, glabrous, greenhouse shrubs, confined to Australia. Flowers white or pink, small, solitary, and shortly pedicellate or almost sessile in the axils of the leaves; petals five, obovate or orbicular;

Micromyrtus—*continued.*

Leaves opposite, small, entire. Probably the species described below is the only one yet introduced. It requires similar treatment to that recommended for **Myrtus** (which *see*).

M. microphylla (small-leaved). *fl.* white, small, nearly sessile in the upper axils, usually forming little racemes on the smaller branches; petals spreading, persistent or deciduous. 1870. Habit erect or diffuse and much-branched.

MICROSORIUM. The plants formerly referred here are now divided, by Hooker and Baker, between **Nephrodium** and **Polypodium** (which *see*).

MICROSPERMA. Included under **Mentzelia** (which *see*).

MICROSTAPHYLA. Included under *Acrostichum.*

MICROSTEPHIUM. Included under *Cryptostemma.*

MICROSTYLIS (from *mikros*, small, and *stylos*, a column; in allusion to the size of the column). SYNS. *Achroanthes, Crepidium, Pedilea, Pterochilus.* ORD. *Orchideæ.* A genus comprising about forty species of stove terrestrial orchids, natives of Europe, Asia, and North and South America. They are allied to *Malaxis*, but distinguished from that genus by the lip being at right angles with the column. Flowers small, usually greenish or yellow. Leaves membranaceous or plicate. For culture, *see* **Liparis.**

M. calophylla (beautiful-leaved).* *fl.* yellow; peduncles rather strong, bearing a raceme about 6in. long. *l.* ovate, yellowish-green, prettily bordered, striped with brown. Pseudo-bulb conical. Indian Archipelago, 1879.

M. chlorophrys (green-leaved). *fl.* purple, with the ears of the sagittate lip ochre-coloured; racemes few-flowered. *l.* oblong, acute, greenish above, and light purple beneath. Borneo, 1881.

M. discolor (two-coloured).* *fl.* yellow, changing to orange, small, on short upright peduncles. *l.* deep reddish-purple, edged with green, plaited longitudinally, and much crisped at the margin. Ceylon, 1863. This species is characterised as among the most lovely of terrestrial orchids. The flowers, though minute, exhibit great singularity of structure when seen under the microscope. (B. M. 5403.)

M. histionantha (sail-flowered). *fl.* brownish-green, in a compact concave umbel; sepals reflexed, oblong; petals minute; column short, with obtuse horns. *l.* two from a broad-ovate or rounded tuber, ovate and membranaceous, with their sheathing bases forming a long tube around the base of the much-angled scape. Columbia. (B. M. 4103.)

M. Josephiana (Sir Joseph Hooker's). *fl.* yellow, small, disposed in terminal racemes. May. *l.* broadly ovate, greenish-brown. Pseudo-bulbs oblong. *h.* 1ft. Sikkim, 1877. (B. M. 6325.)

M. metallica (metallic).* *fl.*, odd sepal yellow, lateral sepals one side rose, the other yellow; petals light rose; peduncle violet, with a long raceme of numerous, rather long-stalked, blossoms. *l.* oblong-acute, of a light rose underneath, blackish-purple above, with an exquisite metallic lustre. Pseudo-bulbs cylindrical. Borneo, 1879.

M. ventilabrum (large-lipped). *fl.* yellow, with a large square lip, sagittate at the base, and seven to nine-toothed at top. *l.* light green, with brownish-tinted veins. Sunda Isles, 1882. A fine species.

M. versicolor (various-coloured). *fl.* various-coloured. June to October. *l.* ovate-lanceolate. *h.* 1ft. China, 1830. (L. B. C. 1751.)

MIDRIB. The middle vein of a leaf, which passes from the petiole to the apex.

MIGNONETTE (*Reseda odorata*). This well-known fragrant little plant is one of the most popular subjects in gardens of every description. Even persons limited to the space of a window-sill may grow some in summer, either in a box or in pots, provided the situation is not too hot. Mignonette does not succeed so well when exposed to heat as it does if kept comparatively cool, the tendency, under the former conditions, being to produce seeds, and this renders the flowering period a short one. It is most largely cultivated from seed, but healthy cuttings may be readily rooted if it is desired to perpetuate any specially good form or variety. Outdoor culture in summer is of the simplest description. Seeds should be sown thinly, in shallow drills, or in any other way desired, during April and May, and be lightly covered

Mignonette—*continued.*

with soil. When the young plants appear, and are large enough to handle, they should be thinned out, as this induces a much stronger growth in those left. These plants will flower in June and the two following months. Another later sowing should be made about July, for producing an autumn supply. Mignonette prefers a rich, rather heavy soil, and a cool, moist situation. If sown in poor, light ground, and in a position exposed to hot sunshine, the seeds possibly will not grow at all, or, if they do, the plants will be far inferior to those which can be treated more in accordance with their requirements. Watering must be freely practised throughout the summer, especially if the weather be more than usually dry. The flowers of Mignonette are amongst the most useful for cutting, as the racemes last so long in water, and emit an agreeable perfume.

Culture in Pots. Mignonette is most extensively cultivated in pots for winter and spring decoration of greenhouses, rooms, &c., its requirements being more fully met, as previously stated, by the cooler temperature then experienced. Tall standard plants are preferred by some cultivators, and seeds for their production are sown in small pots soon after midsummer, or sometimes long previous to this. The best plant in each pot is selected and grown on in an upright direction, the other smaller ones being removed at an early stage. Repotting may be practised as growth proceeds, until 8in. or 9in. pots are reached, if very large plants are desired. Careful training and watering are most necessary, as the shoots are very brittle, and, although the roots generally require plenty of water, anything approaching stagnancy is fatal. Mignonette is far more useful, and is extensively cultivated, for spring flowering in 5in. or 6in. pots. Seeds for the supply should be sown in the latter part of August, and again for a succession in September, using the pots wherein they are intended to grow and flower. The compost used should consist of about two parts loam, one of dried cow manure, and another of old sifted mortar rubbish. The latter ingredient is a most important one for this plant, and the addition of a little soot is also beneficial. All the pots used should be clean, dry, and properly drained. It does not matter how hard the compost is packed into them, provided it is united in a solid mass, and not rammed in layers. A few seeds should be distributed evenly over the surface, and lightly covered with a little sifted soil, similar to that of the bulk. The pots should then be watered, and placed in a shallow, cold frame, on a bottom of coal ashes, where they may remain until October, plenty of air being admitted in the meantime, and the plants thinned to about 1in. apart, when they are large enough to select the best. For winter quarters, the best place is a shelf near the glass in any light, airy house where such plants as Carnations, Bouvardias, &c., are grown, and a temperature of 50deg. to 55deg., with ventilation, is maintained. Failing such provision for Mignonette in houses, it is better to make the best of frames than to subject the plants to a high temperature, or close atmosphere — both most destructive to their well-being, and the prime causes of failure. Each plant must be provided with a small stick before it gets large enough to fall about, and from five to eight will be plenty for the size of pots above-mentioned. Water should only be sparely applied in winter, but never entirely withheld. As the days lengthen, the plants will start into growth freely, and then water may be given in abundance, even to the use of saucers in spring. When the flowers begin to expand, a little artificial manure, mixed with its bulk of dry loam, should be applied to the soil's surface, about once a week. This will materially assist in developing and lengthening the racemes.

Seed Saving. When Mignonette is only required for outside cultivation, or for cutting, it is not of so much importance whether the variety or strain represents its true characters or not, provided the plants are

Mignonette—*continued.*

floriferous and the flowers sweetly scented. For pot culture, it is most desirable that they should be of a vigorous yet compact habit, and of a uniform strength throughout. If several varieties are grown near each other, the flowers will be almost certain to become cross-fertilised by insect agency, and the product will always degenerate rather than improve. Distinct and superior forms often owe their origin to a rigid selection being annually made of the very best plants for seed-bearing, and the weeding out before the flowering period of all showing the least inferiority. Nurserymen, doubtless, do all in their power to retail seeds true to character; but whenever pot culture of Mignonette is practised, and a good type is once obtained, the cultivator should rigidly weed out, from the first, plants of irregular growth, and save seed himself from the others, sufficient, at least, for growing in pots the following year. The standard of quality would be much improved, even in one season, by such a selection, and far less "weeding" would be required afterwards. The seed must be collected so soon as it begins turning brown, and laid out on paper, in a cool, airy room or shed, to dry, when it may be rubbed out, cleaned, and stored in paper bags. If allowed to get quite ripe before being collected, the best seeds will be lost, in consequence of the seed-vessels

FIG. 569. RIPE SEED-VESSEL OF MIGNONETTE.

(see Fig. 569) being always open at the apex, and naturally situated at an angle well suited for readily discharging their contents.

Varieties. Of these, there are several in cultivation, some having what are termed red, and others white, flowers. The old common type of Mignonette is well known, and is one of the most sweetly scented. The following is a selection from the best varieties. There is a double-flowered form in cultivation, which must be propagated from cuttings.

Crimson King. Flowers bright red, sweetly scented; habit dwarf, vigorous, pyramidal. A new and distinct variety, most desirable for pot culture.

Dwarf Erect. Flowers erect, produced in stout, densely-set racemes; habit dwarf and neat.

Garaway's White. Flowers white; racemes large and long. One of the best, either for outside culture or for pots.

Giant Pyramidal. Flowers reddish, sweetly-scented; racemes very large. The plant is of a stout pyramidal habit, and succeeds well outside.

Golden Queen. Flowers golden-yellow, very distinct; habit dwarf and compact. An exceedingly fine Mignonette, of dense growth, very floriferous.

Machet. A new dwarf variety, of French origin, having very fragrant flowers of a bright red colour. The habit is robust, and the racemes broad. Highly recommended for pot culture.

Miles' Hybrid Spiral. Flowers white, very fragrant, produced in dense racemes, sometimes exceeding 1ft. in length. The habit is dwarf and branching, and the variety, when obtained true, is one of the best in cultivation, especially for pots.

Parsons' White. Flowers nearly white, strongly scented; racemes long and well-formed. An excellent variety.

Queen Victoria. Flowers deep red, very fragrant, profuse; habit dwarf, branching. Fine and distinct.

MIKANIA (named after Joseph Mikan, 1743-1814, once Professor of Botany at Prague). ORD. *Compositæ.* A large genus (about sixty species have been described) of stove evergreen climbers, natives, for the most part, of tropical America, allied to *Eupatorium*, but distinguished in the flower-heads containing generally only four florets, and the involucre having as many nearly equal bracts. For culture, *see* stove species of **Eupatorium.**

Mikania—*continued.*

M. apiifolia (Apium-leaved). *fl.-heads* yellowish, small, in lax corymbs. Summer. *l.* dark green, quinate, membranaceous, glabrous, evergreen; segments entire or pinnatifid. Brazil. A pretty climber. (I. H. 1885, 549.)

M. Guaco (Guaco). *fl.-heads* pale blue. *l.* stalked, ovate, subacuminate, remotely toothed. South America, 1823. Climbing perennial.

M. scandens (climbing).* *fl.-heads* yellowish-white, cylindrical, corymbose. Summer. *l.* opposite, cordate, glabrous, shining. Brazil, 1823. This slender climbing perennial is very suitable for growing over trellises, and similar places, in the open air, during the summer months.

MILDEW. A name sometimes applied to several kinds of microscopic fungi that live as parasites on various flowering plants, cultivated and uncultivated; it is, of course, on the former that their occurrence is of interest to the horticulturist. The name is believed to be connected with the German Mehl-thau, or Meal-dew, because of the appearance some Mildews give the affected parts of being sprinkled with flour or meal. Besides living on plants, the Mildews are also found on cloth, on paper, on leather, and even on glass; but the forms growing on these need not be further adverted to here. Nor is it necessary to dwell upon the Mildew of Wheat, Barley, and other grasses, which, if forming dark brown spots, is caused by a species of *Puccinia* (usually *P. graminis*); or, if the spots are orange, by the uredospores of the same fungi. The Mildews of most consequence in gardens are white, and form a coat all over the leaves and young shoots of the plants attacked by them. On microscopic inspection, this is found to consist of slender, creeping threads, which branch freely, and give off branches that rise erect into the air as slender filaments, made up of a single row of cells, of which the terminal ones are larger, oval, and break away from the tip backwards, to form spores, which serve for the reproduction of the fungi. Very many plants are liable to be attacked by this white coating, and there is reason to believe that there are many kinds of it, though all much alike. The various kinds are included, as species, under the genus *Oidium*; but they are known to be merely a stage in development of more highly developed fungi, belonging to *Erisypheæ*. If some kinds of *Oidium*, *e.g.*, those on Peas, on Hops, or on Roses, are watched, it will be found that, after a time, the surface becomes studded with small, yellowish objects, which soon grow darker in colour, and at length become quite black, and resemble grains of gunpowder, scattered abundantly over the *Oidium*. With the microscope these are seen to be fruits of the fungus. Each is a slightly-flattened sphere, with a thin, black wall, formed of cells (peritheciun) surrounding several small transparent bladders (asci), each of which incloses two, four, or eight (rarely six) spores. These are believed to be the result of sexual reproduction. They are very small, and are easily carried about by the wind, or by other means. If they fall on a suitable host-plant, they push out a fine thread, which reproduces the *Oidium* stage once more. The threads of the *Oidium* lie on the outer surface of the plants (not penetrating among the cells, like the Potato Disease fungus, and many others), where they form a web, nourished by means of small branches (haustoria, or suckers), that penetrate into the outer cells (epiderm) of the plant, and absorb food from the cell contents. Some kinds of *Oidium* have not yet been traced to the sexually mature form, *e.g.*, *Oidium Tuckeri*, which is often very hurtful to Vines; *O. Balsamii*, on Turnip leaves, &c. Besides these two, the following White Mildews, of which the fully-developed state is known, are, at times, destructive to garden plants: *Sphærotheca pannosa*, in dense, grey patches, on Peach and Rose twigs and leaves; *S. Castagnei*, very injurious to Hops, as well as to many weeds; *Podosphæra Oxyacanthæ* on Hawthorn twigs and leaves; *Erisyphe Martii* on Peas, and other leguminous plants, and on many weeds; *E. communis* and *E. Cicho-*

Mildew—*continued.*

racearum, on various flowers; *Microsphæra Berberidis*, on Barberry leaves; *M. Grossulariæ*, on Gooseberry bushes; and *Phyllactinia suffulta*, on many trees and shrubs.

Remedies. White Mildews, caused by *Oidium*, being the only kinds that directly concern horticulturists to any extent, the present remarks are restricted to these. As the parasites are external to the host-plants, they can be attacked directly, and can be eradicated without much injury to the latter. Sulphur has proved to be the most reliable means of destroying the fungus. Flowers of sulphur may be dusted over the leaves and other diseased parts; or it may be applied with a syringe, if mixed in water. If applied to bunches of grapes, the sulphur must, of course, be washed off before they are sent to the table or the market. Another useful application is prepared by boiling 1lb. of flowers of sulphur and 1lb. of quicklime, in five pints of water, in an earthen pot, for ten minutes. It should be constantly stirred while it is boiling, then allowed to settle, and the clear liquid poured off for use. The plants should be syringed with a mixture of this preparation with 100 times its bulk of water. Washing the greenhouse flues with a mixture of ½lb. each of flowers of sulphur and of quicklime, in three gallons of water, is also recommended. The fumes emitted under this treatment kill the fungus. The door of the house should be kept closed for about an hour, to retain the fumes, and then the place should be well aired. Ewing's Mildew Composition, much diluted (1oz. to 1 gallon of tepid water), is used with the syringe, and is also very effective. Mildew is apt to prove most destructive in ill-ventilated situations, and it may often be checked, or even prevented by attention to ventilation.

MILFOIL. *See* **Achillea.**

MILKMAID, GOLDEN. *See* **Ilex Aquifolium aurea picta latifolia.**

MILK VETCH. *See* **Astragalus.**

MILKWORT. *See* **Polygala vulgaris.**

MILKWORT, SEA. *See* **Glaux.**

MILLA (named after J. Milla, a gardener to the Spanish Court, in Madrid). ORD. *Liliaceæ*. A monotypic genus. The species is a hardy bulbous plant. It thrives well when placed in sunny spots in the open border, in good, well-drained, loamy soil. Propagated by seeds, or by offsets.

M. biflora (two-flowered).* *fl.* umbellate (in natural state solitary, or often twin); perianth snowy-white inside, greenish outside, salver-shaped; tube elongate-cylindrical; limb flat, expanded. August, continuing a long time in succession, and remaining open at night. *l.* cylindrical, subulate at apex, flaccid, glaucous, almost equal with the scape. *h.* 6in. Mexico. (B. R. 1555; F. d. S. 1459.)

M. hyacinthina (Hyacinth-like). A synonym of *Brodiæa lactea*.

M. ixioides (Ixia-like). A synonym of *Calliprora lutea*.

MILLETIA (named after J. A. Millet, a French botanist of the eighteenth century). SYN. *Berebera*. ORD. *Leguminosæ*. A genus comprising about forty species of sometimes tall, climbing trees or shrubs, of which one inhabits Australia, and the rest the warmer parts of Asia or Africa. Flowers purple, pink, or whitish; racemes terminal, or at the apices of the branches, paniculate; standard ample, spreading or reflexed. Leaves impari-pinnate; leaflets often evergreen, penninerved and reticulate veined, and, for the most part, stipellate. The species described below is probably the only one yet introduced. For culture, *see* **Dolichos.**

M. megasperma (large-seeded).* *fl.* purple, in loose panicled racemes. *l.* pinnate; leaflets glossy, dark green. Queensland, [illegible]. A handsome, evergreen, woody climber, with the habit of *Wistaria sinensis*. (B. M. [illegible].)

MILLINGTONIA (named after Thomas Millington, an English botanist of the eighteenth century, and a writer on vegetable physiology). ORD. *Bignoniaceæ*.

Millingtonia—*continued.*

A monotypic genus, the species being a handsome stove evergreen tree, with deeply cracked and spongy bark. For culture, *see* **Jacaranda.**

M. hortensis (garden). *fl.* pure white, delightfully fragrant, numerous, large; corolla with a very long tube, divided into five segments, the two uppermost of which are more or less grown together; panicle cross-armed, ramifications horizontal, the first trichotomous, then dichotomous, with generally a simple flower in the fork. *fr.* divided into two cells by means of a partition running parallel with the direction of the valves. *l.* opposite, impari-pinnate; leaflets quite entire, 1in. to 3in. long. *h.* 80ft. Birma, 1820. (B. F. S. 249.)

MILLIPEDES (*Chilognatha*). This group of *Myriapoda* is of greater importance to gardeners, and demands fuller consideration here, than their allies the Centipedes. Millipedes are usually nearly cylindrical

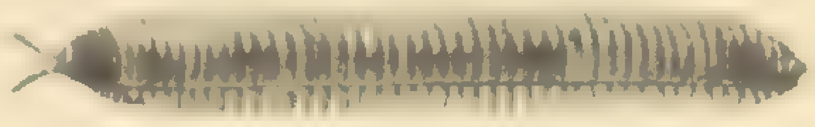

FIG. 570. MILLIPEDE.

(see Fig. 570), less often a good deal depressed and flattened, and the origins of the legs are usually brought very close to the middle line of the body below, instead of being rather widely separated. The legs are thus hidden from view below the body in the living animal; they are also short and individually weak, but are very numerous, though very far below the number indicated by the name Millipede, or Thousand-feet. The three rings immediately behind the head each bear one pair of legs; but each of the rings behind these seems, at first sight, to bear two pairs of legs. This is due to the rings of the abdomen becoming tightly joined together two and two, while the limbs remain useful for movement, and fully formed. The last pair are not enlarged or noticeable, as in the Centipedes. As in the former group, so in the Millipedes, the only kinds met with here are small, seldom, if ever, surpassing 2in. in length; but, among the species of warmer lands, many kinds are upwards of 6in. long, and are stout in proportion to their length. Almost all of this group are in the habit, when disturbed, of curling up the body into a spiral, so as to protect the head, with its various organs, from injury. The Millipedes do not possess poison tubes. They feed, in great part, on decaying vegetable tissues, and they may frequently be met with among dead leaves and other rubbish. In gardens, they may often be found under, or in, flower-pots; and they do damage, at times, to the potted plants, as well as to fleshy roots and tubers in the soil, and to fallen fruits, or to Strawberries. Occasionally they also injure germinating seeds of various cultivated plants, such as Beans, Turnips, &c. It may, at times, be found necessary to diminish their numbers where they are very plentiful. The most hurtful kinds are found to be *Julus guttulatus*, *J. terrestris*, and *Polydesmus complanatus*—the last-named being the flattened Millipede so abundant everywhere.

Remedies. These are seldom pressingly required. Deep trenching tends to lessen any superabundance. Traps may be used, in the form of pieces of carrot, or fallen fruits, laid on the soil. These should be frequently examined, and the Millipedes on them destroyed.

MILTITZIA. A synonym of **Emmenanthe** (which *see*).

MILTONIA (named after Viscount Milton, afterwards Earl Fitzwilliam). ORD. *Orchideæ*. A genus comprising about a score species of very beautiful, stove, epiphytal orchids, with showy flowers. They are, with the exception of one from Peru, all Brazilian, and are allied to *Oncidium* and *Odontoglossum*, but distinguished from both by the short column. Flowers large; sepals and petals alike; lip undivided, sessile, continuous with the column, marked with interrupted lines near its

Miltonia—*continued.*

base; column short, with two auricles; scapes radical, few-flowered. Leaves narrow, flat. The species are dwarf in habit, somewhat rapid growers, and profuse blossomers. As a general rule, amateurs are rarely successful in getting foliage beyond a sickly yellow colour—a drawback which precludes the more extensive culture of these plants. Miltonias can be grown with green leaves and yet produce an abundance of blossoms; but it is not in every orchid house that just the right accommodation can be supplied. The plants like exposure to the light; but, in order to prevent the leaves turning yellow by the action of the sun, a certain amount of shade must be afforded. Miltonias should have plenty of heat and an abundant supply of water, the result of which will be green foliage and plenty of flowers. Some species, such as *M. spectabilis*, do well in a pan suspended from the roof of the house. These plants should not at any season be allowed to suffer from drought; indeed, they must never be kept dry. The pans should be thoroughly drained, and the plants potted in a compost of half-chopped sphagnum and good peat, to which may be added, with considerable advantage, some medium-sized lumps of charcoal. Miltonias should be kept in the East Indian house when growing; and in winter, when at rest, they should be removed to the Cattleya house. Propagated by dividing the pseudo-bulbs, when they commence growth.

FIG. 571. MILTONIA PHALÆNOPSIS.

Miltonia—*continued.*

M. anceps (two-edged). *fl.* dark olive, about 2in. in diameter; lip streaked and dotted with reddish-purple, on a white ground. July. 1851. (B. M. 5572.)

M. Bluntii (Blunt's). *fl.*, sepals and petals whitish-yellow, with some large purple-cinnamon blotches, chiefly in their centre; lip white, with a purple area at the base. 1879. An elegant species.

M. candida (white).* *fl.*, sepals and petals yellowish, spotted with rich brown; lip white, tinged with rosy-pink, remarkably undulated or wavy; scape radical, five or six-flowered. Autumn. Pseudo-bulbs ovate, bearing upon the summit two narrow, light green leaves. *h.* 9in. 1830. A strong, erect-growing species, and one of the handsomest of the genus. Two forms occur in cultivation: in *grandiflora*, the flowers are larger and brighter, with the column purple and the lip white; in *flavescens* (B. M. 3793), both column and lip are yellowish.

M. Clowesii (Clowes').* *fl.* about 3in. across; sepals and petals thick, spreading, ground colour yellow, barred and blotched with rich brown; lip flat, cordate, of a rich purple at the base, and white at the tip; scape erect, many-flowered. Autumn. Pseudo-bulbs ovate, bearing long, sword-shaped, light green leaves. 1840. A very beautiful and remarkably distinct erect-growing plant. (B. M. 4109.) The variety *major* differs from the type only in its larger size and more showy blossoms.

M. C. Lamarcheana (Mons. Oscar Lamarche de Rossius'). A synonym of *M. Lamarcheana*.

M. cuneata (wedge-lipped).* *fl.* nearly 4in. in diameter; sepals and petals dark chocolate, tipped, and sometimes transversely barred, with tawny yellowish-green; lip pure white, tinged with pink near the base, differing in form from that of *M. candida* in being much more narrowed to the base, and scarcely curled at the margin; scape erect, four or five-flowered. Early summer. Pseudo-bulbs somewhat conical. *h.* 1ft. 1843. An erect-growing species, well deserving more general attention than it now

Miltonia—*continued.*

receives; although not so showy as several others, it is, nevertheless a handsome plant. (I. H. vii. 237.)

M. Endresii (Señor Endres'). *fl.* creamy-white, each petal having a rose-coloured blotch at its base; sepals also with smaller blotches at the base; lip pandurate, dilated, four-lobed; scape slender, five-flowered. *l.* linear-ligulate, acute. Pseudo-bulbs oblong, one-leaved. A difficult plant to grow, and now rare in cultivation. As there already was a *Miltonia Warscewiczii*, it has been necessary to give another specific name. Señor Endres was the first to introduce the species in a living state to this country. (B. M. 6163, under name of *Odontoglossum Warscewiczii*.)

Miltonia—*continued.*

M. festiva (gay). *fl.*, sepals and petals ochre-coloured, narrow; lip large, pointed in front, purplish-lilac, with radiating streaks of deep purple; peduncles two-flowered. 1868. A very showy species, resembling *M. spectabilis* in growth and general appearance.

M. flavescens (yellowish).* *fl.*, sepals and petals yellow, linear-lanceolate, acuminate; lip sessile, yellow, spotted with blood colour; bracts straw-colour, glumaceous, over 2in. long, scarcely shorter than the flowers. June. *l.*, primordial ones short, linear-oblong; perfect ones linear-ensiform, obtuse, apiculate, pale green. Rhizomes creeping. 1830. (B. R. 1627, under name of *Cyrtochilum flavescens*.)

FIG. 573. MILTONIA VEXILLARIA.

Miltonia—*continued.*

FIG. 572. FLOWER OF MILTONIA SPECTABILIS.

M. Lamarcheana (Mons. Oscar Lamarche de Rossius').* *fl.*, sepals and petals yellow, with broad cinnamon bars; lip cordate at base, abruptly broader from the middle; base with an obscure globular tumour; front part with seven keels, whitish-ochre, with a broad, pandurate blotch before the keels. 1881. This species is closely allied to *M. candida*. (B. H. 1876, 13, under name of *M. Clowesii Lamarcheana*.)

M. Phalænopsis (Phalænopsis).* *fl.* pure white, about 2in. across; lip white, with a large portion of the centre rich purplish-crimson, and a yellow base; spike slender, from one to three-flowered, shorter than the leaves. May. *l.* slender, grass-like, pale green or glaucous. Pseudo-bulbs ovoid, of a very pale whitish-green. 1850. A very distinct and handsome species, seldom exceeding 8in. in height. See Fig. 571. (B. O. 3, under name of *Odontoglossum Phalænopsis*.)

M. P. luxurians (luxuriant). *fl.*, lip having two large crimson blotches on the front lobe, some crimson streaks on the side lobes, and the callus broadly bordered with yellow. 1881. A free-growing, floriferous variety. (I. H. 417.)

M. P. solare (solar). *fl.*, anterior part of lip very broad, basilar portion broad, nearly circular, and of a yellow colour, with stripes, all with outward points of purple. 1879. A curious and interesting variety.

M. Regnelli (Regnell's).* *fl.*, sepals and petals soft rosy-white, bordered with white, broad, spreading; lip flat, lilac-rose; scape erect, as long as the leaves, many-flowered. Autumn. Pseudo-bulbs somewhat conical, bearing narrow pale green leaves upon their summit. *h.* 1ft. 1864. A very desirable erect-growing species. (B. M. 5436.) There is a handsome variety, *purpurea*, with lip of a rich rosy-purple hue.

M. Roezli (Roezl's). *fl.*, sepals pearly-white; petals stained with a rich vinous-purple at the base; lip large, flat, bilobed in front,

Miltonia—*continued.*

white stained with yellow at the base, and ornamented more or less with streaks of chocolate-brown; racemes three or four-flowered. Autumn. *l.* narrowly-lanceolate. Pseudo-bulbs 2½in. high. 1873. In general habit and appearance there is little difference between this species and *M. vexillaria*, but the sepals and petals are longer than in the latter. (B. M. 6085; B. O. 30, under name of *Odontoglossum Roezlii*.)

M. R. album (white). *fl.* large; lip broad, obcordate, pure white, with a small yellow crest. 1875.

M. Russellianum (Duke of Bedford's). *fl.*, sepals and petals dark purple, margined with green, ovate-oblong; lip lilac, with purple disk, margined with white; raceme few-flowered, radical. *l.* broad, ligulate-lanceolate, green, spreading. Pseudo-bulbs ovate, costate, two-leaved. 1835. (B. R. 1830, under name of *Oncidium Russellianum*.)

M. spectabilis (showy).* *fl.*, very showy, from 3in. to 4in. across; sepals and petals somewhat short, pure white, often tinged with rose at the base; lip very large, of a rosy-violet, margined with white; scape one-flowered. Autumn. Pseudo-bulbs produced upon a creeping stem, considerably compressed, and bearing a pair of thin, strap-shaped leaves upon their summit. *h.* 6in. to 8in. 1835. This species is by far the best known of the genus, and, when well grown, is a most beautiful plant. See Fig. 572. (B. M. 4204.) There are several varieties of more or less excellence.

M. s. bicolor (two-coloured). *fl.* white; lip white, with a blotch of violet in the upper part. August. 1839. A handsome variety, but with a stronger habit and larger flowers than the type.

M. s. Moreliana (Morel's).* *fl.*, sepals and petals deep purple; lip also of a rich deep purple, streaked and shaded with rose. In habit of growth this closely resembles the type; indeed, it can only be distinguished by the flowers, which are even larger than those of *M. spectabilis*. (B. M. 4425.)

M. s. rosea (rose-coloured). *fl.*, lip rose. SYN. *M. Warneri*.

M. s. virginalis (virgin). *fl.* pure white, with a spot of rose.

M. vexillaria (standard).* *fl.* variable in size, in three or four-flowered racemes; perianth quite flat; sepals sub-equal, obovate-oblong or obovate-cuneate, sub-acute or truncate, flat, rather recurved, very pale rose; petals larger or smaller than the sepals, deep rose, with a broad white margin; lip white, suffused with deep rose on the disk of each half, and pale yellow, streaked with red, on the claw; column very short. *l.* narrowly-elliptic-lanceolate, from a narrower sheathing base, acute, keeled, deep green above, paler beneath. Pseudo-bulbs narrow-oblong, compressed. 1872. See Fig. 573. (B. M. 6037, under name of *Odontoglossum vexillarium*.)

M. Warneri (Warner's). A synonym of *M. spectabilis rosea*.

M. Warscewiczii (Warscewicz's).* *fl.*, sepals and petals bright cinnamon, tipped with yellow, undulate at the margins; lip flat, of a soft violet-purple, white in front, tinged or blotched occasionally with brownish-yellow; scape, in vigorous specimens,

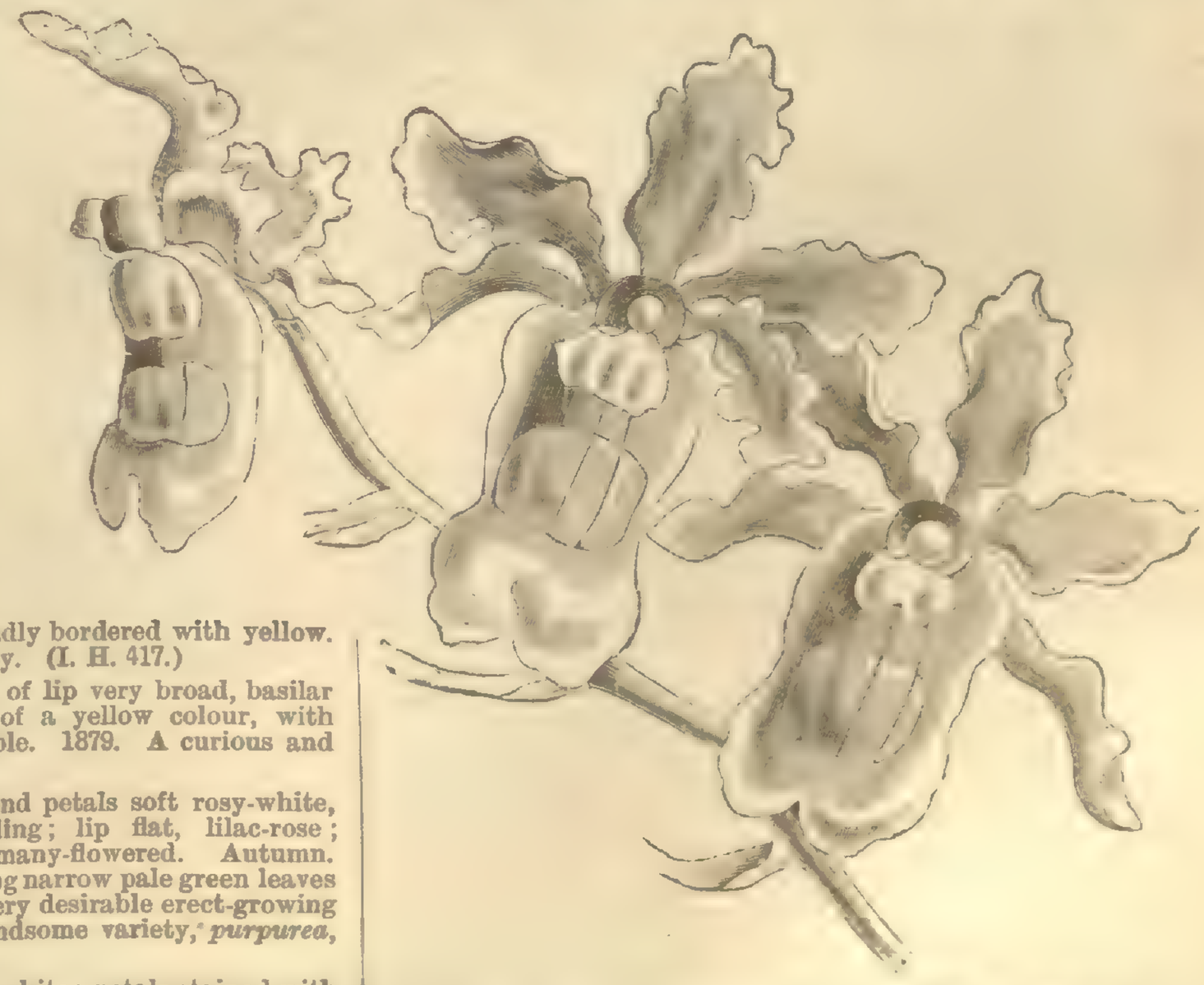

FIG. 574. FLOWERS OF MILTONIA WARSCEWICZII.

Miltonia—*continued.*

erect and branched (differing, in this respect, from most other members of the genus), many-flowered. Under favourable conditions, it will blossom twice during the year. Pseudo-bulbs long, much flattened or compressed, dark green, bearing two leaves. Peru, 1869. A beautiful, erect-growing species, requiring less heat than the Brazilian species, and subject, apparently, to considerable variation in the colour of its flowers in different specimens. It was first sold under the name of *Oncidium Weltoni*, and has also been known in gardens as *Oncidium fuscatum* and *Odontoglossum Weltoni*. See Fig. 574. (B. M. 5843.)

MIMETES (from *mimos*, a mimic; referring to its resemblance to an allied genus). Including *Orothamnus*. ORD. *Proteaceæ*. A genus comprising fourteen species of greenhouse, evergreen shrubs, natives of South Africa. Flower-heads hermaphrodite; perianth narrow, often incurved; limb ovoid or oblong. Nuts sessile, ovoid, glabrous. Leaves few, sessile, entire, or rarely dentate at apex. The undermentioned species, probably the only one yet introduced, thrives in a peat and loam soil, with plenty of moisture. Cuttings of the ripened shoots should be taken, towards autumn, or in the spring, before growth commences, and inserted in sand, under a glass, without bottom heat—at least, until a swelling occurs at their base.

M. Zeyheri (Zeyher's). *fl.-heads* one to three or more at the extremity of a branch, drooping; bracts glabrous, similar to the leaves; leaves of involucre petaloid, rose-red, veined, villous; laciniæ of the calyx villous. July. *l.* alternate on the branches, sessile, imbricated, numerous, entire, elliptic, membranous, externally convex, within concave, 1in. to 1½in. long, margined with purple. *h.* 6ft. to 8ft. (B. M. 4357, under name of *Orothamnus Zeyheri*.)

MIMOSA (from *mimos*, a mimic; the leaves of many of the species mimic animal sensibility). Sensitive Plant. ORD. *Leguminosæ*. This genus, as now understood, comprises about 230 species of herbs, rarely tall climbing shrubs, or unarmed or prickly trees, natives, for the most part, of the warmer parts of America, a few inhabiting tropical Africa and the East Indies, but none are yet known from Australia. Flowers small, sessile, in globose heads or cylindrical spikes; peduncles axillary, solitary, or fasciculate. Leaves bipinnate, often sensitive, with one or more pairs of pinnæ, each pinna bearing two or more pairs

FIG. 575. FLOWERING BRANCH AND SINGLE FLOWER-HEAD, WITH LEAF, OF MIMOSA PUDICA.

of leaflets. Mimosas thrive in a compost of loam and peat, in equal proportions, to which a small portion of sand may be added. Propagated by seeds, sown, during spring, in a hotbed; or by cuttings of rather firm young shoots, inserted in sandy soil, in heat. The species commonly known as the "Sensitive Plant" is *M. pudica*, whereas the true one is *M. sensitiva*. *M. pudica* is usually treated as an annual, but, under stove treatment, it assumes a perennial character.

M. marginata (margined).* *fl.* in purplish heads on peduncles at least twice as long as the leaves. Summer. *l.* pinnate; leaflets

Mimosa—*continued.*

with ciliated margins. Extra-tropical South America. A handsome prostrate shrub, producing long slender shoots, which have an elegant appearance, if allowed to hang down from the rafters of a conservatory.

M. pudica (chaste).* Humble Plant. *fl.* red. Summer. *l.* somewhat digitately pinnate, with four pinnæ, each pinna bearing many pairs of linear leaflets. Stem herbaceous, prickly, with the petioles and peduncles more or less beset with stiff hairs or bristles. *h.* 1ft. Tropical America (naturalised in many parts of tropical Africa and Asia), 1638. A well-known plant, even more sensitive than the true *M. sensitiva*. See Fig. 575. (A. B. R. 544.)

M. scandens (climbing). A synonym of *Entada scandens*.

M. sensitiva (sensitive). *fl.* purple. Summer. *l.*, leaflets ovate, acute, clothed with adpressed hairs beneath, but glabrous above, not so sensitive to the touch as those of *M. pudica*. Stem and petioles prickly. *h.* 3ft. to 6ft. Tropical America, 1648. An evergreen shrub. (B. R. 25.)

MIMULUS (from *mimo*, an ape; in reference to the ringent corolla). Monkey Flower. Including *Diplacus*. ORD. *Scrophularineæ*. A genus comprising about forty species of hardy or half-hardy, erect or decumbent, glabrous, pilose, or viscid, herbs, rarely tall or shrubby. They are dispersed over the extra-tropical or mountainous parts of America, Asia, Australia, and Africa, being numerous in Western America; but the genus is totally absent from Europe and the whole Mediterranean region. Flowers axillary, solitary, pedicellate, superior ones sometimes racemose; corolla bilabiate; upper lip erect or reflexed, bilobate; lower lip trilobate. Leaves opposite, undivided, entire, or toothed. The species are showy and ornamental, and their culture is very simple. All the herbaceous species thrive best in a rather moist situation, and are well worth naturalising in damp borders, by the margins of streams, and in similar situations. The shrubby species do best under pot culture in a cool greenhouse. The seed, being generally very small, must be sown on the surface, and only very lightly covered with soil. When the seedlings are 1in. or so high, they should be transferred singly to 6in. pots, and again into the next larger size just previous to flowering. An excellent compost for pot culture is two parts loam, one leaf soil, and one cow manure. The common Musk, *M. moschatus*, is a well-known and favourite plant, both for outside borders and for pot culture in spring. Its variety, *Harrisonii*, is a strong-growing, large-flowered form, which has become equally as popular as the type. It makes an excellent pot plant. Propagation of Mimulus may also be effected by cuttings and by divisions.

M. aurantiacus (orange). A synonym of *M. glutinosus*.

FIG. 576. UPPER PORTION OF PLANT AND DETACHED FLOWER OF MIMULUS CARDINALIS.

M. cardinalis (cardinal).* *fl.* red, large; peduncles longer than the leaves. June to August. *l.* stem-clasping, ovate, with erosely toothed margins. *h.* 1ft. to 3ft. Oregon to California and Mexico,

Mimulus—*continued.*

1835. An erect, villous, hardy perennial. See Fig. 576. (B. M. 3560; S. B. F. G. ser. ii. 358.)

M. Fremontii (Fremont's). *fl.* crimson, with spreading limb. *l. spathulate or oblong. Stems 2in. to 4in. high. California*, 1882. Half-hardy or greenhouse perennial, suitable for pot culture.

M. glutinosus (glutinous).* *fl.*, corolla usually buff or salmon-colour, obscurely bilabiate. Flowers nearly all the year round. *l.* linear-lanceolate, sub-connate, serrulate, acute. *h.* 5ft. California. A very elegant, erect, branching, greenhouse shrub. SYN. *Diplacus glutinosus.* (B. M. 354, under name of *M. aurantiacus.*)

M. g. puniceus (scarlet).* *fl.* varying from orange-red to scarlet; corolla lobes commonly obcordate. Western California. (B. M. 3655, under name of *Diplacus puniceus.*)

M. guttatus (speckled). A synonym of *M. luteus guttatus.*

M. Lewisii (Lewis').* *fl.* rose-coloured; corolla lobes spreading; peduncles longer than the leaves. August. *l.* amplexicaul, oblong, or rarely ovate, acute, somewhat toothed, many-nerved. *h.* 1ft. California, &c., 1831. Hardy, herbaceous, erect. SYN. *M. roseus* (under which name it is figured in B. M. 3353, B. R. 1591, L. B. C. 1976, and S. B. F. G. ser. ii. 210).

M. luteus (yellow).* Common Monkey Flower. *fl.* yellow, with two dark marks in the mouth of the corolla. Summer. *l.* ovate or oblong, coarsely toothed. Stems ascending, stout, hollow, glabrous or glandular. *h.* 9in. to 12in. Chili, 1826. Though generally treated as a half-hardy or hardy annual, this species is, under favourable conditions, of perennial duration. (A. B. R. 661; B. M. 1501.) Mr. Hemsley remarks, in his "Handbook of Hardy Trees, Shrubs, and Herbaceous Plants": "*M. variegatus*

FIG. 577. FLOWERING BRANCH OF MIMULUS LUTEUS VARIEGATUS.

(SYN. *M. rivularis*, see Fig. 577) and *M. guttatus* are considered by some botanists as varieties of *M. luteus*, and by others as distinct species; and the fact that hybrids between these forms and *M. luteus* are frequent, seems to strengthen the former supposition. *M. variegatus* (L. B. C. 1872) is a Chilian form,

FIG. 578 FLOWER OF MIMULUS LUTEUS NEUBERTI.

Mimulus—*continued.*

having much larger, richly coloured flowers, irregularly blotched with crimson, maroon, or purple, on a yellow or white ground, sometimes uniformly yellow or reddish. *M. guttatus* is a Californian form near the last, in which the flowers are spotted with purple-brown on a yellow ground. The intermediate varieties of these three forms are numerous and beautiful." (B. M. 3336, 3363; B. R. 1030, 1796; S. B. F. G. ser. ii. 406.) *M. l. Neuberti* (Fig. 578) is a strain with double flowers. *M. l. nobilis* (Fig. 579)

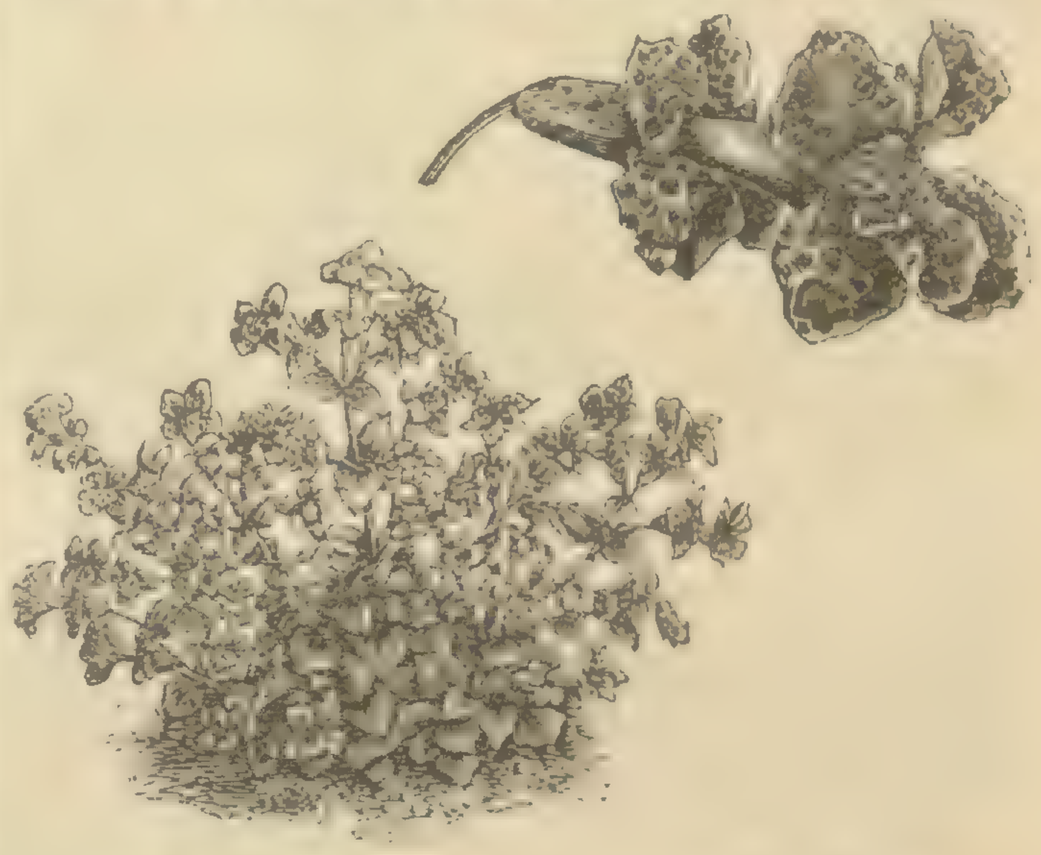

FIG. 579. MIMULUS LUTEUS NOBILIS, showing Habit and detached Flower.

is a dwarf floriferous garden strain with "hose-in-hose" flowers varying in colour.

M. l. cupreus (coppery).* *fl.* copper-coloured, purplish-brown, or crimson, almost regular, with the limb of the corolla velvety and spotted. Summer. *l.* ovate-lanceolate, toothed; upper ones sessile. *h.* 8in. to 12in. Chili, 1861. (B. M. 5478; R. G. 422.) This species is the origin of a great number of very beautiful hybrids, known as *M. maculosus.*

M. moschatus (musk).* Musk. *fl.* yellow, small, nearly regular. June to September. *l.* petiolate, ovate, or ovate-lanceolate, a little toothed, rounded at the base, rather pilose, and somewhat clammy. Stems diffuse, clothed with woolly villi. North-western America, 1826. A well-known and favourite little hardy perennial. (B. R. 1118.)

M. primuloides (Primula-like).* *fl.* yellow, ringent, solitary, on axillary, scape-like, filiform peduncles, 3in. to 4in. long. *l.* obversely lanceolate or obovate, many-nerved. California, &c. Hardy tufted perennial. (R. G. 1009.)

M. radicans (rooting). *fl.* white, with a violet blotch; upper lip small, bifid, lower large and three-lobed. *l.* small, densely packed, obovate, obtuse, hairy or glabrous, ¼in. long. Stem creeping, with short leafy branches. New Zealand, 1883. A very pretty and attractive hardy perennial bog plant.

M. repens (creeping). *fl.* lilac, with a yellow-spotted throat, comparatively large. *l.* opposite, ovate or oblong. Australia, 1864. A dwarf greenhouse or half-hardy perennial. (B. M. 5423.)

M. rivularis (river-bank). A synonym of *M. luteus variegatus.*

M. roseus (rosy). A synonym of *M. Lewisii.*

M. variegatus (variegated). A synonym of *M. luteus variegatus.*

MIMUSOPS (from *mimo*, an ape, and *opsis*, a face; so named on account of the form of the corolla). SYN. *Synarrhena.* ORD. *Sapotaceæ.* A genus comprising about thirty species of milky-juiced stove trees, or rarely shrubs, broadly dispersed over the tropical regions of the globe. Flowers fasciculate, in the axils, at the nodes, or at the apices of the branches; calyx segments six or eight; corolla lobes eighteen to twenty-four. Berry globose, edible. Leaves coriaceous. The two species here described are probably the only ones yet introduced. For culture, *see* **Chrysophyllum.**

M. dissecta (divided). A synonym of *M. Kauki.*

M. Elengi (Elengi). *fl.* white, drooping, fragrant; petals lanceolate, a little torn at the tips; pedicels many together. *fr.* ovate, with a slight groove on one side, dotted, yellow when ripe. *l.* oval-lanceolate or oblong, acuminated. *h.* 50ft. Deccan and Malay Peninsulas, 1796. (B. F. S. 40.)

M. Kauki (Kauki). *fl.* white, fascicled. *fr.* oval, drooping. *l.* obovate, very blunt, silvery or hoary beneath, crowded at the ends of the branches. *h.* 30ft. Birma, Malaya, and tropical Australia, 1796. (B. M. 3157, under name of *M. dissecta.*)

MINA. Referred, by Bentham and Hooker, to *Ipomœa*.

MINT (*Mentha*). There are three species of Mint, all hardy perennials, cultivated more or less in gardens, for the use of their tops or leaves in the preparation of sauces, or for other culinary purposes. They are popularly known as Pennyroyal (*M. Pulegium*); Peppermint (*M. piperita*); and Spearmint (*M. viridis*).

Pennyroyal is least used of the three. It is readily propagated by division of the roots, in autumn or spring, and succeeds best in a moist, loamy soil. When transplanting, a space of 1ft. should be allowed between the rows, and half that distance between the plants.

Peppermint is grown chiefly for the use of its tops for distillation, to obtain the valuable cordial well known by the same name. Propagation may easily be effected by lifting the roots, in February or March, dividing them, and planting again in shallow trenches about 9in. apart, covering with 2in. of soil. Cuttings in summer, or offsets in spring, may also be utilised for increasing a stock. A moist situation is preferable, but Peppermint will succeed in almost any soil when once started into growth. The tops should be cut off just as they are coming into flower, and distilled as soon as possible afterwards. The beds are much benefited by an annual topdressing of good soil.

Spearmint is most largely in request, particularly in spring and early summer. A good stock should be kept up, so that plenty may be available for forcing. The propagation and cultivation are the same as given above for Peppermint. A portion of the tops should be cut when coming into flower, and suspended in a cool shed for winter use. Green leaves are always preferable to dry ones, and forcing is very easy, the only preparation being the insertion of a quantity of roots in a box of soil, which should be placed in a temperature of about 60deg., and kept watered. Forcing will generally be necessary from November to May, a succession being kept up by the introduction, at intervals, of an additional supply of roots.

FIG. 580. FLOWERING BRANCH OF MIRABILIS JALAPA.

MIRABILIS (from *mirabilis*, wonderful). Marvel of Peru. SYNS. *Jalapa*, *Nyctago*. ORD. *Nyctagineæ*.

Mirabilis—*continued.*

A genus comprising about ten species of very ornamental greenhouse or hardy di-trichotomously branched, glabrous or glandular-pubescent, perennial herbs, confined to the warmer parts of America. Flowers white, scarlet, or various-coloured, large, fragrant or inodorous; involucres one to many-flowered, in often densely-branched cymes; perianth tube elongated, constricted above the ovary. Leaves opposite, lower ones petiolate, upper ones sessile. Root elongated or tuberous. The species most generally grown is *M. Jalapa*. This thrives very well in almost any ordinary garden soil, but does best in a good friable loam. It is really perennial, but is usually treated as a half-hardy annual, by sowing seeds, in a warm frame, during the early spring, and planting the seedlings out in the open in May. The other species mentioned prove hardy in the South of England, and require similar treatment.

M. dichotoma (twice-forked). *fl.* yellow, expanding in the afternoon. July. *l.* ovate, sub-acuminate, obtuse at base. *h.* 2ft. Mexico, 1640. Greenhouse.

M. Jalapa (jalap).* Common Marvel of Peru. *fl.* very variable, white, yellow, crimson, or striped or blotched with two or more of these colours, fragrant. Summer. *l.* large, entire, smooth. *h.* 2ft. Mexico and Central America, 1596. Generally treated as a half-hardy annual, but the tuberous roots can be taken up and stored like Dahlias. See Fig. 580. (B. M. 371.)

M. longiflora (long-flowered). *fl.* varying in colour from white and pink to violet, long, tubular, fragrant, viscid. July. *l.* cordate, acuminate. *h.* 2ft. Mexico, 1759. Hardy. (S. E. B. 23.)

M. multiflora (many-flowered).* *fl.* bright purple, with a tube about 2in. long, disposed in terminal panicles, each panicle inclosed in a cup-like involucre. *l.* opposite, ovate. Mexico and California, 1876. A very beautiful hardy plant, clothed with glandular pubescence. (B. M. 6266.)

MIRBELIA (named after C. F. Mirbel, 1776-1854, a distinguished French physiological botanist). Including *Dichosema* and *Oxycladium*. ORD. *Leguminosæ*. This genus comprises about sixteen species of greenhouse shrubs, with the habit of *Oxylobium* or of *Chorizema*, limited to Australia. Flowers yellow, purple-red, or blue, solitary, or clustered in the axils of the leaves, or in axillary or terminal racemes. Leaves opposite or whorled, rarely alternate, entire or broadly lobed at the top. The species here described are those best known to cultivation. For culture, *see* **Chorizema.**

M. dilata (dilated). *fl.* purplish. May to August. *l.* cuneiform, dilated and trifid at the apex. *h.* 3ft. 1803. (B. R. 1041.)

M. grandiflora (large-flowered). *fl.* yellow, having a red zonate mark on the upper side of the vexillum, and streaked with the same on the outer surface, the wings having a red blotch on one side; axillary, twin. May. *l.* alternate, ovate-lanceolate. *h.* 1ft. to 2ft. 1823. (B. M. 2771.)

M. reticulata (netted). *fl.* lilac, terminal, capitate, or axillary, verticillate. May to August. *l.* lanceolate-linear, reticulately veined, quite entire, ending in a stiff mucrone. *h.* 1ft. to 3ft. 1792. (B. M. 1211.)

M. speciosa (showy). *fl.* purple, disposed in a terminal, interrupted, leafy spike. May to July. *l.* linear, rather acute, with revolute, quite entire margins. *h.* 1ft. to 2ft. 1824. (B. R. 1841, 58.)

MISCANTHUS (from *miskos*, a stem, and *anthos*, a flower; alluding to the tall stems). ORD. *Gramineæ*. A genus comprising eight species of tall grasses, of which one is South African, and the rest inhabitants of Eastern Asia, from the Malayan Archipelago to Japan. Panicles terminal, large, with long silky hairs, or rarely almost glabrous; branches spreading, simple or scarcely divided. Leaves narrow, often flat. Probably none of the species have yet been introduced to our gardens.

MISTLETOE. *See* **Viscum album.**

MITCHELLA (named after Dr. John Mitchell, of Virginia, an early correspondent of Linnæus, and an excellent botanist; he died in 1768). ORD. *Rubiaceæ*. A genus comprising a couple of species of glabrous or puberulous creeping herbs, one dispersed through North America, from Mexico to Canada, and the other inhabiting Japan. Flowers white, fragrant, axillary and terminal, ebracteate, small; calyx tube ovoid; limb three

Mitchella—*continued.*

to six-toothed, persistent; corolla funnel-shaped; throat bearded; limb three to six-lobed, bearded within, recurved, valvate. Fruit scarlet. Leaves opposite, shortly petiolate, ovate-rotundate; stipules intrapetiolar, minute. *M. repens*, the species introduced to cultivation, is a pretty little plant for rockeries, hardy ferneries, and such like places. Propagated by division of the roots.

M. repens (creeping).* *fl.* white, tinged with purple, usually two together on the top of each peduncle, fragrant. Summer. *l.* small, opposite, roundish-ovate, smooth, shining, often variegated with whitish lines. North America, 1761. (L. B. C. 979.)

MITELLA (a diminutive from *mitra*, a mitre or cap; alluding to the form of the young pod). Including *Drummondia*. ORD. *Saxifrageæ*. A genus consisting of five species of hardy perennial herbs, natives of North America and North-eastern Asia, only two of which have been introduced. Flowers greenish, small, distant, often secund or nodding, in slender many-flowered racemes; scape slender, erect, naked, or one or two-leaved. Leaves long-stalked, cordate, lobed or crenated. The species thrive in any light soil, but do best if grown in peat. Propagated by divisions. *M. diphylla* is a pretty plant for the rockery. Both the species here described are from North America.

M. diphylla (two-leaved). *fl.* white, with pinnatifidly fringed petals. April. *l.*, radical ones cordate, somewhat three to five-lobed, dentately serrated, on long petioles; cauline ones two, opposite, smaller, and nearly sessile. *h.* 6in. to 9in. 1731. (B. R. 166.)

M. pentandra (five-anthered).* *fl.* yellowish; petals five, pectinately pinnatifid, alternating with the sepals; scape leafless. May. *l.*, radical ones on long petioles, cordate, bluntly lobed. *h.* 6in. 1827. SYN. *Drummondia mitelloides*. (B. M. 2933.)

MITES. These form a group of animals related to the true Spiders, but differing from them in their very small size, and in having the abdomen closely united with the front part of the body, instead of being joined to it by a narrow stalk. Most Mites have six jointed legs when young, and eight when full-grown; though in a good many the posterior pairs are very small and useless, or may not be present. One group, the *Phytopti*, or Gall Mites, so far as known, have never more than two pairs of very short legs, on the lower surface of the body, in front. All the true Mites are so small as to render the microscope indispensable in examining them; but, despite their small size, they form an important order of animals, because of their abundance and habits. Many species live on dead or decaying organic matter; others exist as parasites on living animals, especially on insects; and those belonging to *Tetranychidæ* and *Phytoptidæ* are parasites on living plants, and therefore deserve somewhat fuller mention here. The species parasitic on animals may be regarded as mostly useful, since they feed largely on insects; but among them are one or two that are, at certain seasons, very troublesome to gardeners, fruit-pickers, and others. The best known of these is the Harvest Bug (*Tetranychus*, or *Leptus autumnalis*), which is of a brick-red colour, and so minute as to be invisible to the naked eye, and which swarms upon bushes and vegetables in the garden, as well as in hay and stubble fields. They feed ordinarily on plant juices, but very readily attack the human skin, especially the skin of women and children; and they are also very troublesome to domestic animals. Wherever a Mite has fixed on the skin, it causes a hard swelling of a red colour, and the place bitten continues to itch greatly for some time. Mites are more abundant during late summer and autumn. They attack some people very severely, others hardly at all. Remedies are as follows: Washing the parts bitten with weak spirits will often prove serviceable in reducing the itching. Sulphur ointment, solution of carbolic acid, and benzine, have also been used, and have been found to give relief. The true Itch Mite (*Sarcoptes scabiei*) is sometimes very annoying, as it causes intense itching at the wrists and knuckles, where it burrows under the skin. The disease is propagated by contact of healthy with diseased hands, directly, or by handling the same things. It is easily got rid of by personal cleanliness and the use of sulphur ointment.

Mites—*continued.*

The Plant Mites belong to the two families *Tetranychidæ* and *Phytoptidæ*. The former group includes eight-legged Mites, which live on leaves and twigs, suck the juices, and often greatly injure the plants thereby. They are usually minute, semi-transparent, and some shade of white, yellow, or pale brick-red. They spin a web on the backs of the leaves. The latter become discoloured, and turn yellowish or grey above, shining dirty-white below. Garden and greenhouse plants often suffer much from their attacks. They are best combated by applications of soft soap and sulphur. Quassia solutions may also be used. *See also* **Red Spider.**

The *Phytoptidæ*, or Gall Mites, have long, slender, nearly colourless bodies, and are easily known by their form, their having two pairs of very short legs near the head, and their habit of forming galls on plants. The Mites are very numerous, but are too small and too similar to be easily distinguished; hence, the galls must be employed to recognise the kind of Mites that made them. Cultivated trees and herbs seldom suffer much from the galls on them, so that it is needless here to mention more than the chief forms. These are: 1. The *Erineum* galls, in the form of patches of velvety hairs on the lower (rarely upper) surface of the leaves; these patches pass from white into rusty-brown. They were at one time described as fungi. Examples occur on Apple, Maple, Birch, Beech, &c. 2. Inrolled leaf-margins, with thickened and discoloured tissues, such as may often be seen on leaves of Hawthorn. 3. Blistered spots in the leaves; these spots become brown or black, and are then very conspicuous. Pear leaves are, at times, very much injured in this way; and Elm leaves are yet more frequently infested, though the injury done to them is less. On a careful examination, there is found to be a small hole on the lower surface, about the middle of each discoloured spot, giving passage to the Mites to and from the interior of the leaf. 4. Wart, or Nail Galls, consist of outgrowths from the upper surface of leaves, like warts, about the size of pin-heads, or like small nails, reaching ¼in. long, and are abundant on Lime, Maple, Willow, and many other trees and shrubs; but, beyond their unsightliness, they usually do little harm to the plants. 5. Bud Galls are buds caused to swell greatly, but to remain unopened, or to form only sickly branches; or, if this continues for some years, it may give rise to knots of diseased branches. The Mites live between the scales of the buds. Much harm is done in this way to Black Currant bushes in some places, and also to Hazel and to Birch. 6. The flower-buds are injured, and become green, and the parts of the flowers are often replaced by green structures, as in reversions to the leaf-type. Campanulas, and a few other cultivated subjects, are liable to this change; but it is more frequent in some wild plants; *e.g.*, in the genus *Galium*, or the Bedstraws. Yet other forms of Mite Galls might be noted, but they are of no practical moment to gardeners.

It is impossible to reach the Mites, protected as they are in their galls. As a rule, the species that gall the leaves do little practical mischief; but those that gall the buds so spoil the appearance of some plants as to render their destruction desirable. The only certain method is to collect the plants that bear the young galls, and destroy them before the exit of the Mites. Plants (*e.g.*, Currants) badly affected with Bud Galls should be uprooted and burned, and the ground allowed to remain clear of the same plants for a year or two at least.

MITRACARPUM (from *mitra*, a mitre, and *karpos*, a fruit; in allusion to the fruit being cut round about in the middle). ORD. *Rubiaceæ*. A genus comprising about thirty species of erect or prostrate herbs, very often with a perennial root, for the most part inhabiting tropical America, with a few from tropical and Southern Africa. Flowers white, minute, in dense-flowered heads; calyx tube turbinate, obovoid, or subglobose; limb four or five-toothed; corolla salver-shaped or funnel-formed; tube often with a band of hairs within, throat naked or villous. Leaves opposite, linear-lanceolate or ovate. *M. stylosum*, the species introduced to cultivation, is a stove annual. None of the species are of any horticultural merit.

MITRARIA (from *mitra*, a mitre; in reference to the shape of the seed-pod). SYN. *Diplocalyx*. ORD. *Gesneraceæ*. A monotypic genus. The species is a very ornamental, hardy or half-hardy, diffuse or climbing, pubescent or glabrous, evergreen shrub, of comparatively easy culture, and thriving best in moderately close, rather fibry peat, with plenty of sand. Perfect drainage is very essential. If grown in pots, it requires a cool shady situation; an arid atmosphere is fatal to success. Propagated freely by divisions of the root in spring; or by cuttings, taken any time during spring or summer, and inserted in a light soil, under a bell glass.

Mitraria—*continued.*

M. coccinea (scarlet).* *fl.* bright scarlet, about 1½in. long, solitary in the axils, on pendent slender pedicels; calyx free; corolla tube elongated, inflated. May to July. *l.* ovate, acute, small, serrated, sub-coriaceous. Stems scandent. Chiloe, 1848. (B. M. 4462; F. d. S. 385.)

FIG. 581. FLOWERING BRANCH AND DETACHED SINGLE FLOWER OF MITRIOSTIGMA AXILLARE.

MITRIFORM. Formed like a mitre.

MITRIOSTIGMA (from *mitra*, a mitre, and *stigma*; in reference to the shape of the pistil). A small genus (two species) of very glabrous, unarmed stove shrubs, closely related to *Gardenia*, with which they are usually classed. One comes from the Cape of Good Hope, and the other is a native of Fernando Po. Flowers disposed in short,

Mitriostigma—*continued.*

few-flowered, branched cymes; calyx tube ovoid; limb five-parted; corolla narrowly campanulate, with a short tube, a glabrous or villous throat, and a five-lobed rotundate limb. Leaves opposite, petiolate, membranaceous, elliptic-lanceolate, acuminate. For culture of *M. axillare*, *see* **Gardenia.**

M. axillare (axillary-flowered).* *fl.* white, very fragrant, single, axillary. Spring. *l.* opposite, somewhat coriaceous, elliptical, lanceolate, dark green. *h.* 5ft. Natal. A compact spreading species. See Fig. 581. (B. M. 4987, under name of *Gardenia citriodora*.)

MNEMOSILLA. A synonym of **Hypecoum** (which *see*).

MOCKER NUT. *See* **Carya tomentosa.**

MODECCA (the East Indian name of one of the species). ORD. *Passifloreæ*. A genus comprising about twenty-five species of stove evergreen climbing shrubs, with the general habit of *Bryonia*; they are found in Asia, Africa, and tropical Australia. Flowers unisexual; peduncles axillary, branched. Leaves entire, palmately lobed, or pinnatifid. The species have no horticultural value.

MODIOLA (from *modiolus*, the nave of a wheel; referring to the formation of the seed vessel). ORD. *Malvaceæ*. A genus containing several species (which are, in all probability, only varieties of one) of hardy, or nearly hardy, creeping or trailing herbs. Flowers on axillary, solitary, rarely twin, one-flowered, slender peduncles. Leaves usually five-lobed, doubly serrate. *M. multifida*, a North American plant, of no horticultural merit, is in cultivation in botanic gardens.

M. geranioides (Geranium-like). A synonym of *Malvastrum Gilliesii*.

MŒHNIA. A synonym of **Gazania** (which *see*).

MŒHRINGIA (named after Paul Henry Gerard Mœhring, a German physician, author of "Hortus Proprius," 1736). ORD. *Caryophylleæ*. A small genus (included, by Bentham and Hooker, under *Arenaria*) of pretty, hardy, herbaceous perennials, allied to *Arenaria*, but differing in the seeds, which have a strophiole at the hilum. Flowers pentamerous or tetramerous. For culture, *see* **Arenaria.**

M. muscosa (mossy).* *fl.* white, small, axillary, solitary. Summer. *l.* linear, connate. *h.* 3in. to 4in. Europe, 1775.

MOHRIA (named after Daniel Mohr, a German botanist, who died in 1808). ORD. *Filices*. A monotypic genus. The species is a sweet-scented greenhouse fern, with the habit of *Cheilanthes*. Capsules sessile, placed on the back of the leafy frond near the edge. *M. caffrorum* and its variety require a compost of peat and sand, to which should be added small lumps of sandstone. They thrive in a cool greenhouse, and constitute pretty subjects for the Wardian case, if plenty of room is allowed. For general culture, *see* **Ferns.**

M. caffrorum (Kaffir).* *sti.* tufted, 3in. to 4in. long, slightly scaly. *fronds* 6in. to 18in. long, 2in. to 4in. broad, tripinnatifid; pinnæ close, lanceolate-oblong, cut down to a narrowly-winged rachis into oblong pinnules, which are pinnatifid and deeply toothed in the barren frond, less divided in the fertile one. Cape of Good Hope, &c., 1842. SYN. *M. thurifragra*.

M. c. achilleæfolia (Achillea-leaved). A finely-cut variety, with the fronds almost quadripinnatifid. It is not so robust as the type, and is much rarer in cultivation.

M. thurifragra (frankincense). A synonym of *M. caffrorum*.

MOLE (*Talpa Europæa*). This animal is too universally known to call for any detailed description of its appearance. Its structure is remarkable, because of the numerous adaptations that it presents to fit the animal for burrowing, and for rapid movement through the tunnels it has made a few inches below the surface of the soil. The front part of the body is much stouter than the rear. The fore legs are very powerful, and have the bones curiously modified to support the very strong muscles of the limb, which serves the part of a digging instrument, and to throw the loosened earth backwards. The hand, or fore paw, is made broader by an additional bone along the inner side. The skin is strong, and the fur is close and velvety, and lies smoothly in whatever direction it is stroked. The eyes are so small as to be practically useless to the animals, which are, however, possessed of acute hearing and smell. The teeth prove them to be carnivorous, and observation proves that Moles feed on insects, chiefly as larvæ, and on earthworms. Occasionally a little vegetable matter may be swallowed along with this food. The home of the Mole is usually situated in some well-protected place, *e.g.*, under a large stone or the root of a tree; and there are usually several passages diverging from it, into any one of which the Mole may retreat for shelter when in danger. The female makes a nest of dried grass, or other herbage, in a specially-constructed chamber, and in it she brings forth four or five naked young ones. It is probable that Moles do more good than harm when they confine their operations to the fields; but in gardens they do much damage in flower borders, by cutting the roots of the flowers; and their earth-heaps render lawns very unsightly. It is, therefore, necessary to remove them from gardens whenever they find their way in, and this is best done by the use of traps set in their burrows or runs. As the animals are very wary, it is needful to take special precautions against the smell of one's hands remaining about the traps. Where a molecatcher's services can be obtained, it will probably be found advisable to employ them if it is necessary to rid a garden of Moles.

MOLE CRICKET (*Gryllotalpa vulgaris*). This insect belongs to the family *Gryllidæ*, of the order *Orthoptera*, but is so different in its whole appearance from any other of our native insects, that there can be no difficulty in recognising it from the accompanying wood-

FIG. 582. MOLE CRICKET.

cut (Fig. 582). Its colour is smoky-brown above, and yellowish-red below, with a velvety gloss on the surface. The sexes are much alike, but the females have the abdomen large, the sixth ring being broader than the others, while in the male the sixth ring is the narrowest. They reach a length of between 1½in. and 2in. The popular name of "Mole Cricket" is derived from the resemblance in form of the front pair of legs to those of a mole, the legs in each being broad, flattened, very strong, and so placed as to form very efficient instruments for digging burrows, and for throwing the earth backwards. The form of the body also in both is suited to permit easy movement along the burrows. The insect prefers light, sandy, or cultivated soils, and is, therefore, partial to gardens, and avoids stiff clays. It occurs throughout Southern and Central Europe, and is common in many places in the South of Britain, but does not extend to the North. It remains so hidden in its burrows that its presence in a locality may hardly be suspected, even where common when looked for. In digging its burrows, it cuts the roots that it encounters, causing the plants to wither without evident cause. The female makes a nest underground, and in it lays from 200 to 400 eggs; when the larvæ emerge, she watches over them till their first

Mole Cricket—*continued.*

change of skin, after which they dig burrows for themselves. The development from the egg to the perfect state is said to require from two to three years. The metamorphosis is incomplete. Mole Crickets eat the underground parts (whether roots or stems) of many plants, *e.g.*, Potatoes, roots of potherbs, and flowers. But their favourite food seems to be insects and worms; and this may be regarded as, to some extent, compensating for the damage done by them. They are so voracious that, when starved, they have been known to eat their own limbs. They may be caught by laying down pieces of raw meat as traps, on which the insects may be found feeding; or benzole or petroleum may be poured into their burrows to kill them, or to drive them away. Digging them out is often impracticable when they get into a flower-bed or border.

MOLINIA (named in honour of J. Molina, a writer upon Chilian plants). SYN. *Enodium*. ORD. *Gramineæ*. A monotypic genus. The species is a rather tall, tufted, hardy, perennial grass. It will thrive on wet, bleak moors, where the better sorts of grasses do not succeed.

M. cærulea (bluish). *fl.*, spikelets reddish, violet-purple, or green, few, narrow; flowering glumes deciduous, ovate-lanceolate, subacute; empty glumes shorter; anthers violet-brown; panicle 1in. to 12in. long, stout, much contracted; rachis flexuous, compressed; branches erect. July and August. *l.* smooth, rigid, hairy at base, the tips very slender; sheaths smooth. Stems 1ft. to 3ft. high, terete, striate, with but one node, and that towards the base, naked above. Europe (Britain). (Sy. En. B. 1747.) The variegated form, *M. c. variegata*, is an excellent bedding plant.

MOLLOYA. Included under **Grevillea** (which *see*).

MOLLUGINEÆ. A tribe of *Ficoideæ*.

MOLOPOSPERMUM (from *molops*, a stripe, and *sperma*, a seed; the fruit is yellowish, and the vittæ chestnut-coloured, giving the fruit the appearance of being striped). ORD. *Umbelliferæ*. A monotypic genus. The species is a large and handsome hardy fern-like perennial. It is an admirable subject for naturalising in the wild garden, and has been used with success when isolated on grass. It thrives best in a moderately good and deep soil. Propagated by divisions; or by seeds, sown when ripe.

M. cicutarium (Cicuta-like). *fl.* yellowish-white, umbellate; terminal umbels large, fertile; lateral ones smaller, male. May. *l.* ternately-decompound; leaflets lanceolate, elongated, shining or decurrently-pinnate; segments sharply pinnatifid. Stems large, hollow. *h.* 3ft. to 5ft. Mountains of Southern and Central Europe, 1596.

MOLTKIA (named after Count Gadske Moltke, who died in 1818; founder of a Museum of Natural History at Copenhagen). ORD. *Borragineæ*. A genus comprising six or seven species of elegant, hardy or half-hardy, strigose-canescent, herbaceous perennials, natives of South Europe and Eastern and Western Asia. Flowers blue or yellow, in terminal, secund bracteate spikes; corolla tubular, funnel-shaped, with a naked throat. Leaves alternate, narrow. The two species here described are probably the only ones yet introduced. For culture, *see* **Onosma.**

M. cærulea (blue). *fl.* bluish-purple; spikes 4in. to 6in. long; bracts lanceolate. April. *l.* oblong-lanceolate, acute, rather silky. Stem shrubby at the base, ascending. *h.* 1ft. Asia Minor, &c., 1829.

M. petræa (rock).* *fl.* at first pinkish-purple, deep violet-blue when open, in simple, forked or branched, short, revolute, terminal, dense cymes; corolla glabrous; calyx hoary. June. *l.* 1in. to 1½in. long, one to two lines broad, narrow-linear or linear-oblong. Stem woody below. *h.* 6in. to 8in. Dalmatia, &c., 1845. This species thrives best in a cool greenhouse. (B. M. 5942, under name of *Lithospermum petræum*; B. R. 1843, 26, as *Echium petræum*.)

MOLUCCA. A synonym of **Moluccella** (which *see*).

MOLUCCELLA (a diminutive from Molucca, of which one of the species was supposed to be a native). SYN. *Molucca*. ORD. *Labiatæ*. This genus comprises a couple of species of hardy or half-hardy annuals, inhabiting the Mediterranean region. Whorls axillary, many-flowered.

Moluccella—*continued.*

Leaves petiolate, deeply crenated or cut. The species here described is remarkable on account of the singular form of the calyces, which are shallowly bell-shaped, and densely arranged on erect stems. It forms an excellent subject for skeletonising. Seeds should be sown in a hotbed, during spring, and the seedlings transferred to the open border during May. A sandy loam is the most suitable soil.

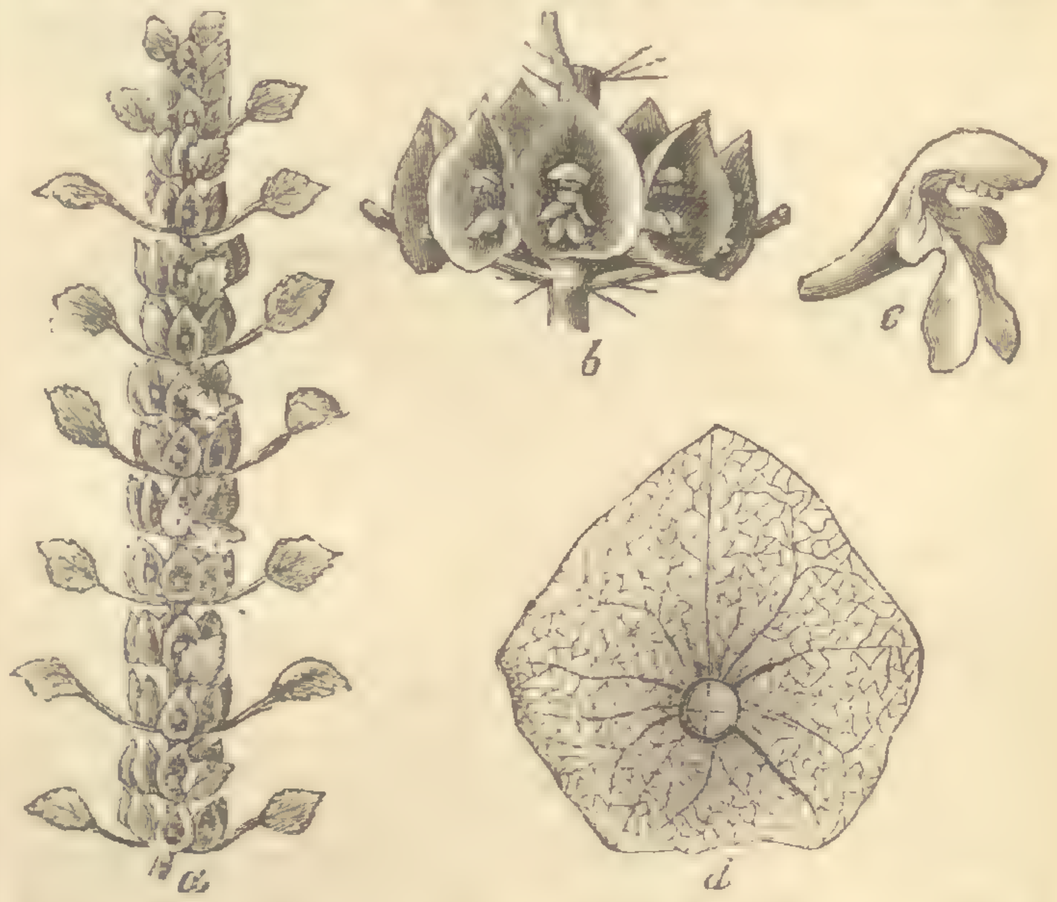

FIG. 583. MOLUCCELLA LÆVIS, showing (*a*) Upper Portion of Plant, (*b*) a single Whorl of Flowers, (*c*) Corolla, and (*d*) the large Calyx.

M. lævis (smooth). *fl.*, corolla white, shorter than the limb of the calyx, which is large, membranaceous, sub-pentagonal, and with five very short teeth; whorls usually six-flowered, distant. August. *l.* on long petioles, roundish, coarsely crenated. *h.* 1ft. to 1½ft. Syria, 1570. Hardy. See Fig. 583. (B. M. 1852).

MOLY. *See* **Allium Moly.**

MOMORDICA (from *momordi*, perfect of *mordeo*, to bite; the seeds have the appearance of being bitten). Including *Neurosperma*. ORD. *Cucurbitaceæ*. A genus comprising about twenty-six species of annual or perennial, glabrous or pilose, climbing stove herbs; they are mostly natives of Africa, but a few are thinly spread over the tropical regions of the globe. Flowers white, yellow, or straw-colour, small or large, of separate sexes, both of which are borne on the same or on different plants, and have a campanulate five-lobed calyx, and five distinct petals. Fruit oblong, fusiform, or cylindrical, baccate, indehiscent or three-valved, fleshy, prickly or warted externally, bursting when ripe, generally with elastic force, into irregular valves. Leaves entire, lobed or pedate, or three to seven-foliolate. The species in cultivation are raised annually from seed, which should be sown in heat early in spring. The plants may be grown in large pots of rich soil, or be planted out in a heated structure and trained up the rafter, or on a trellis. The fruits are very ornamental after they get ripe and burst open. The species here described are probably the only ones yet introduced.

M. Balsamina (balsam-bearing). Balsam Apple. *fl.* yellow, with brown spots. June. *fr.* orange-coloured, roundish-ovate, attenuated at both ends, angular, tuberculated, splitting irregularly and laterally. *l.* palmately five-lobed, toothed, glabrous, shining. Australia, Tropical Asia, and Africa, 1568. An exceedingly pretty annual, well adapted for trellises, arbours, &c., in warm situations outside, and in a rich light soil. Plenty of water should be given during the growing period.

M. Charantia (Charantia).* *fl.* yellow. June. *fr.* oblong, acuminated, angular, tuberculated, copper-coloured or red, bursting open, when ripe, at the apex. *l.* somewhat palmately five-lobed, dentate, rather hairy. India, Malaya, China, and tropical Africa, 1710. Allied to *M. Balsamina*, but very distinct, and larger in all its parts. (B. M. 2455.)

M. cochinchinensis (Cochin China). *fl.*, males very large, fully 4in. in diameter; calyx deeply cut into five ovate-lanceolate lobes, striated with black; corolla patenti-campanulate, of five petals,

Momordica—*continued.*

which are pale straw-coloured externally, villous within on the disk, and copiously veined; three inner petals black-purple at base; peduncles long, single-flowered; female flowers like the males, on peduncles 1in. to 2in. long, bracts small about the middle. July. *fr.* red, large, oval-rotundate. *l.* varying in size, cordate, palmately three to five-lobed; segments sinuate-dentate; petioles long, grooved, bearing conspicuous peziza-shaped glands. Stems climbing. India, Formosa, Philippines, &c., 1820. (B. M. 5145, under name of *M. mixta.*)

M. Elaterium (Elaterium). A synonym of *Ecballium Elaterium.*

M. mixta (mixed). A synonym of *M. cochinchinensis.*

MONACHANTHUS. Included under *Catasetum.*

MONACHOSORUM. Included under *Polypodium.*

MONADELPHOUS. Having the filaments cohering into a tube.

MONANDROUS. Having only one stamen.

MONANTHES (from *monos*, one, and *anthos*, a flower; the flowers are often solitary). SYN. *Petrophyes.* ORD. *Crassulaceæ.* A small genus (three species) of exceedingly dwarf and pretty, greenhouse, perennial, tufted herbs, natives of the Canary Islands and Morocco. Flowers purple or orange, small, on slender pedicels; petals six to twelve, linear or lanceolate; peduncles slender, erect, one to many-flowered, cymose or racemose. Leaves fleshy, rosulate, at the tips of the branchlets, or on elongated branches, opposite or alternate, clavate or cylindrical-ovoid. Stems filiform, dichotomous, creeping. For culture, *see* **Crassula.**

M. atlantica (Atlantic). *fl.* sub-solitary, and in short, few-flowered, terminal cymes; petals six, golden-yellow, speckled with red on the back, ovate-elliptic; anthers dark red. April. *l.* sub-sessile, ¼in. long, succulent. Stem branched from the base; branches prostrate, 1in. to 3in. long, naked below, bearing a densely imbricated rosette of twenty to thirty leaves towards the apex. Mount Atlas, 1871. (B. M. 5988, under name of *M. muralis.*)

M. muralis (wall), of Hooker. A synonym of *M. atlantica.*

MONARDA (named after Nicolas Monardes, or Monardes, 1493-1588, a physician and botanist of Seville). Horse Mint. ORD. *Labiatæ.* A genus comprising six or seven species of very ornamental hardy herbaceous perennials, inhabiting North America. Flowers in close heads or whorls, surrounded by bracts; corolla long and slender, deeply bilabiate. Leaves simple, toothed. The species are of very easy culture in ordinary soil, and in any position but a too shady one. Monardas may be readily increased in autumn by division of the roots. They have a more telling effect when planted in masses, than as small specimens, in mixed borders.

M. affinis (related). A synonym of *M. fistulosa.*

M. allophylla (different-leaved). A synonym of *M. fistulosa.*

M. altissima (very lofty). A synonym of *M. fistulosa.*

M. amplexicaulis (stem-clasping). A synonym of *M. Bradburiana.*

M. aristata (awned). A synonym of *M. clinopodioides.*

M. Bradburiana (Bradbury's). *fl.* white, pink, with reddish bracts; calyx hirsute, and somewhat contracted at the orifice, its teeth elongated and aristiform; corolla tube not exceeding the long and narrow, pubescent upper lip. June. *l.* ovate or ovate-lanceolate, from a broad roundish or sub-cordate base, acuminate. *h.* 2ft. 1850. SYN. *M. amplexicaulis.* (B. M. 3310, under name of *M. fistulosa flore-maculata.*)

M. clinopodioides (Clinopodium-like). *fl.*, bracts of the rather small heads mostly green or greenish, erect, oblong-ovate to obovate-lanceolate, rigid, strongly three to five-nerved, hispid-ciliate; calyx-teeth erect, rigid, aristiform-attenuate; tube purplish, hirsute; throat densely villous. Stem slender, 1ft. or more high. SYN. *M. aristata* (under which name it is figured in B. M. 3526).

M. didyma (twin).* Oswego Tea. *fl.* bright scarlet; whorls solitary or twin, supported by a leafy bract, the leaflets being of a pale green colour, tinted with red. July to September. *l.* petiolate, ovate-lanceolate, acuminated, roundly sub-cordate at the base, rather hispid on both surfaces. Stem square, grooved, hard. *h.* 1½ft. 1656. SYNS. *M. fistulosa, M. Kalmiana.* (B. M. 145.) See Fig. 584. (B. M. 546.)

M. fistulosa (fistular).* Wild Bergamot. *fl.* purple, less numerous than in *M. didyma*, and mostly produced in single heads; bracts tinted with purple. Summer. *l.* petiolate, ovate-lanceolate, roundly sub-cordate at the base. Stems fistular or filled. *h.* 2ft. to 5ft. 1656. This species has several varieties. SYNS. *M. affinis, M. allophylla, M. altissima, M. longifolia, M. oblongata.*

M. fistulosa (fistular), of Sims. A synonym of *M. didyma.*

M. f. flore-maculata (spotted-flowered). A synonym of *M. Bradburiana.*

M. f. media (intermediate). *fl.*, corolla deep purple. SYNS. *M. media* (S. B. F. G. 98), *M. purpurea* (L. B. C. 1396).

M. f. mollis (soft). *fl.*, corolla varying from flesh colour to lilac, glandular, and its upper lip hairy outside, or more bearded at the tip. *l.* paler, soft, pubescent beneath, often shorter petioled. SYNS. *M. Lindheimeri, M. menthæfolia* (B. M. 2958), *M. mollis, M. scabra.*

M. f. rubra (red). *fl.*, corolla bright crimson or rose-red. SYN. *M. purpurea.*

FIG. 584. FLOWERING BRANCH OF MONARDA DIDYMA.

M. Kalmiana (Kalm's). A synonym of *M. didyma.*

M. Lindheimeri (Lindheimer's). A synonym of *M. fistulosa mollis.*

M. longifolia (long-leaved). A synonym of *M. fistulosa.*

M. lutea (yellow). A synonym of *M. punctata.*

M. media (intermediate). A synonym of *M. fistulosa media.*

M. menthæfolia (Mentha-leaved). A synonym of *M. fistulosa mollis.*

M. mollis (soft). A synonym of *M. fistulosa mollis.*

M. oblongata (oblong). A synonym of *M. fistulosa.*

M. punctata (dotted). *fl.*, calyx-teeth spreading, hardly longer than the width of the villous orifice of the tube: floral leaves and bracts whitened or purplish, or both, often slender-acuminate. Summer. Stem usually 2ft. high. SYN. *M. lutea.* (A. B. R. 546; B. R. 87.)

M. purpurea (purple), of Loddiges. A synonym of *M. fistulosa rubra.*

M. purpurea (purple), of Pursh. A synonym of *M. fistulosa media.*

M. Russellianum (Russell's). *fl.* pale, veined with purple; bracts purplish. July to September. *l.* nearly sessile, lanceolate, roundly sub-cordate at the base, ciliated on the edges. Stem glabrous or ciliated on the angles. *h.* 2ft. to 3ft. 1823. (B. M. 2513; H. E. F. 130; S. B. F. G. 166.)

M. scabra (rough). A synonym of *M. fistulosa mollis.*

MONARDELLA (a diminutive of *Monarda*). ORD. *Labiatæ.* This genus comprises about eleven species of hardy, annual or perennial, pleasantly aromatic, fragrant herbs, much resembling *Monarda* in aspect and inflorescence, natives of North-west America. Flowers in terminal and solitary verticillate heads, subtended or involucrate by broad, often membranous and coloured bracts; corolla red, rose-purple, or rarely white. Leaves mostly entire. For culture, *see* **Monarda.**

M. candicans (whitish). *fl.* white; calyx-teeth short, rather broad and obtuse, villous both sides; bracts minutely pubescent outside, ovate, greenish along the numerous nerves, at least the tip and margins white-scarious, shorter than the flowers. *l.* lanceolate or narrowly-oblong, obtuse, tapering into a slender petiole. *h.* 1ft. 1853. Annual.

M. macrantha (large-flowered). *fl.* scarlet, with a long tube and a five-parted limb; heads close, terminal, about 2in. long. Autumn. *l.* stalked, ovate. 1877. A handsome and highly aromatic perennial, with a creeping root-stock, and tufted, procumbent or ascending stems. (B. M. 6270.)

MONESES (from *monos*, single, and *esis*, delight; alluding to the pretty and solitary flower). ORD. *Ericaceæ*. A monotypic genus, the species being a small, stemless, very glabrous, stolon-bearing, hardy, perennial herb. It is sometimes erroneously classed under **Pyrola** (which *see* for culture).

M. uniflora (one-flowered). *fl.* white or pink, ¾in. in diameter, terminal on the one or two-bracted scape; calyx five- (rarely four-) parted, persistent; petals five, rarely four, orbicular, sessile. June. *l.* ½in. to 1in. long, radical, petiolate, persistent, serrulate, coriaceous. Central and Northern Europe (Britain), North America, and Japan. SYN. *Pyrola uniflora* (under which name it is figured in Sy. En. B. 900).

MONEYWORT. *See* **Lysimachia Nummularia.**

MONEYWORT, CORNISH. *See* **Sibthorpia europæa.**

MONILIFORM. Formed like a necklace; that is to say, with alternate swellings and contractions, resembling a string of beads.

MONIMIA (after Monime, the wife of Mithridates). ORD. *Monimiaceæ*. A genus consisting of three species of shrubs, natives of the Mascarene Islands. Flowers small, dicœcious, shortly cymose, in the axils. Leaves opposite, entire, coriaceous, often softly pubescent. The species are not grown in this country.

MONIMIACEÆ. An order of rarely climbing, often fragrant, trees or shrubs, natives of the warmer parts of Asia and America, the Mascarene Islands, Australia, and the Southern Islands of the Pacific. The order is divided into two tribes—i. *Monimieæ*, ii. *Atherospermeæ*. Flowers cymose or racemose, rarely solitary, small or medium; inflorescence axillary, or rarely terminal, shorter than the leaves. Leaves opposite, or rarely alternate, entire, or irregularly serrate, coriaceous, or rarely membranaceous, penniveined; stipules none. *Monimiaceæ* possess a tonic and stimulating volatile oil in all their parts; and the succulent fruit of some is edible. There are about twenty-two genera and 150 species. Examples are: *Laurelia*, *Monimia*, and *Peumus*.

MONIZIA. Included under **Thapsia** (which *see*).

MONKEY FLOWER. *See* **Mimulus luteus.**

MONKEY PUZZLE. A common name for **Araucaria imbricata** (which *see*).

MONK'S-HOOD. *See* **Aconitum.**

MONNINA (named after Monnino, Count de Flora Blanca, a Spanish promoter of botany). SYN. *Hebeandra*. ORD. *Polygaleæ*. A genus comprising about fifty species of greenhouse evergreen herbs, shrubs, or small trees, natives of Western America. Flowers usually with a white or yellowish corolla and blue calycine wings; disposed in spike-formed, terminal or lateral racemes. Leaves alternate or scattered. Few of the species have any horticultural value. For culture, *see* **Polygala.**

M. obtusifolia (obtuse-leaved). *fl.* drooping; corolla of five reddish-purple petals, united into one hollow keel, disposed in solitary terminal racemes. June. *l.* obovate, obtuse, entire, 1in. long, attenuated into a short petiole. *h.* 12ft. Peru, 1830. A slender, upright shrub. (B. M. 3122.)

M. xalapensis (Xalapa). *fl.* bright blue, in copious racemes; tip of the three-lobed keel yellow. *l.* alternate, oblanceolate, acute or acuminate, bright green, 2in. to 4in. long. Mexico, 1879. A rather effective shrub. (B. M. 6415.)

MONOCERA. Included under **Elæocarpus** (which *see*).

MONOCHÆTUM (from *monos*, one, and *chaite*, a bristle; in allusion to the shape of the connective of the stamen). ORD. *Melastomaceæ*. A genus comprising about twenty-three species of erect, branched, often tomentose or pubescent, greenhouse shrubs and sub-shrubs, natives of the mountains of Peru, New Grenada, Venezuela, Mexico, and Guatemala. Flowers violet or purple, paniculate, sometimes in fours; calyx tube campanulate, lobes four; petals four, obovate. Leaves ovate

Monochætum—*continued.*

or lanceolate, five to seven-nerved. The species are of easy culture, thriving best in a compost of two parts good fibrous peat, one of light loam, and one of leaf mould. Propagated by cuttings, placed in sandy peat, under a glass, in heat.

M. alpestre (rock).* *fl.* bright red, solitary, terminal, 1½in. to 2in. across. *l.* very shortly stalked, rather obtuse, broad or ovate-lanceolate, three to five-nerved; margin obscurely sinuate-crenate, and ciliated. Mexico. A small, compact, much-branched shrub, the young growths more or less tinged with red.

M. dicranantherum (dicranantherous). A synonym of *M. Hartwegianum*.

M. Hartwegianum (Hartweg's).* *fl.* bright rose-colour, the upper half of the plant, or more, consisting of a series of small flowering panicles, collectively forming an oblong large panicle, mixed with a few leaves. Winter. *l.* shortly-stalked, elliptic-lanceolate, rigid, bright green above, pale beneath. Andes. A beautiful dwarf shrub. (B. M. 5506, under name of *M. dicranantherum*.)

M. Humboldtianum (Humboldt's).* *fl.* rich reddish-purple, produced in great abundance; square stems and calyces beautifully tinged with vivid red. *l.* bright green, oblong-acuminate, five to seven-nerved. October to December. Caraccas, 1863. (B. M. 5367.)

M. Lemonianum (Lemon's). *fl.* deep rich violet rose. Winter and early spring.

M. sericeum multiflorum (many-flowered silky).* *fl.* rich mauve, produced in great profusion during the early spring months. A garden variety.

M. tenellum (delicate). *fl.* rich purple, disposed at the ends of the branches and branchlets in few-flowered cymes, rarely solitary. October. *l.* oblong-ovate, acute, five-nerved; margin ciliate-setose. Guatemala.

MONOCHILUS (from *monos*, one, and *cheilos*, a lip; alluding to the form of the flower). ORD. *Verbenaceæ*. A monotypic genus, remarkable for the form of its corolla. The species is a pretty, low, stove herb. It thrives in a compost of loam, peat, and sand. Propagated by cuttings inserted under a bell glass, in bottom heat.

M. gloxinifolius (Gloxinia-leaved). *fl.* white, disposed in terminal elongated racemes, solitary in the axils of the bracts, shortly pedicellate; calyx campanulate, shortly five-fid; corolla tube cylindrical, oblique above, scarcely enlarged, cloven at back; limb very oblique. *l.* alternate or almost opposite, rather large, membranous, repand-toothed. Brazil, 1838.

MONOCHLAMYDEOUS. Having but one floral envelope.

MONOCHORIA (from *monos*, one, and *chorizo*, to separate; the anterior stamen is different from the remaining five). ORD. *Pontederiaceæ*. A genus comprising about half-a-dozen species of stove aquatic herbs, inhabiting the East Indies, China, Japan, the Malayan Archipelago, and tropical Australia and Africa. Perianth campanulate, with distinct segments; tube none; racemes sometimes sheathed with the cauline leaves, very short, with the flowers numerous, rather long-stalked, fascicle-formed, sometimes longer, rather lax or almost spike-formed; pedicels very short; spathe complicated, at the base of the raceme or in the sheath at the base of the peduncle. Radical leaves long, cauline ones shorter, petiolate; blade sagittate, cordate-ovate, or lanceolate. The species here described are probably the only ones yet introduced. For culture, *see* **Pontederia.**

M. hastata (spear-shaped). *fl.* blue, in crowded umbels; perianth six-cleft; spathe oblong, opening sideways. July. *l.* arrow-shaped, obtuse or pointed. *h.* 2ft. East Indies, 1806. (A. B. R. 490, under name of *Pontederia dilatata*.)

M. vaginalis (sheathed). *fl.* blue, mostly rufous outside; spike distant-flowered, sometimes sub-campanulate; pedicels longer than the flowers. Summer. *l.* long-stalked, mostly cordate or cordate-ovate, more or less distinctly acuminate. *h.* 2ft. Eastern Asia, &c.

M. v. Korsakowii (Korsakow's). *fl.* violet, large, scarcely rufous outside; inflorescence paniculate or sub-paniculate, few-flowered. Summer. *l.* variable, usually very broadly rotundate-cordate. *h.* 1ft. or more. A showy plant. (R. G. 1862, 374.)

MONOCOTYLEDONS, or ENDOGENS. One of the two great classes into which all flowering plants are divided. They may be characterised as follows: Stem with the wood forming longitudinal bundles, irregularly

Monocotyledons, or Endogens—*continued.*

disposed, not in concentric layers, and having no defined central pith. Leaves with usually parallel veins; exceptions to this character are not uncommon amongst *Aroideæ, Dioscoreæ,* and *Liliaceæ.* Flowers with the organs mostly in threes or fours, never in fives; in grasses, the parts are arranged in twos and threes. Embryo with a single cotyledon; first-formed leaves alternate; radicle not branching, but throwing out adventitious roots.

MONODORA (from *monos,* one, and *dora,* a skin; in allusion to the fruit being one-celled). ORD. *Anonaceæ.* A small genus (three species) of stove trees, confined to tropical Africa. Flowers variegated, large, pendulous, solitary or long-pedunculate, terminal or opposite the leaves. Fruit large, globose, woody, containing a number of seeds, closely packed in pulp. *M. Myristica,* the only species yet introduced, thrives in a light sandy loam. Propagated by ripened cuttings, inserted in sand, under a glass, in moist heat.

M. Myristica (Nutmeg). Calabash Nutmeg. *fl.,* outer petals bright yellow, variegated with purple spots; inner whitish, and downy on the outside, shining and pale yellow, with crimson spots, inside. *fr.* somewhat similar to nutmegs. *h.* 20ft. 1843. The seeds abound in an aromatic oil, of nutmeg flavour; and the entire fruit is very like a small calabash. (B. M. 3059.)

MONŒCIOUS. Having one sex in one flower, and the other in another, on the same plant.

MONOGRAMME (from *monos,* one, and *gramma,* writing; referring to the sori arranged in a single row on the narrow fronds). Including *Pleurogramme.* ORD. *Filices.* A genus comprising about ten species of small, grass or rush-like, stove plants, the simplest in structure of all the Ferns. Sori linear, close to the midrib on one or both sides. The species are of no horticultural value.

MONOGYNOUS. Having but one style, although many carpels may be present.

MONOLENA (from *monos,* one, and *olene,* the arm; alluding to the arm or process from the base of the anther). ORD. *Melastomaceæ.* A genus comprising four or five species of fleshy, stemless, glabrous, stove herbs, with thick rhizomes, inhabiting the woods of Peru and New Grenada. Flowers flesh-coloured, large, in scorpioid cymes, shortly pedicellate; calyx tube turbinate, trigonal; lobes five, ovate, obtuse; petals five, elongated obovate-spathulate, obtuse; scapes slender. Leaves long-stalked, oblong, cordate or orbiculate, entire or denticulate. The undermentioned is a very handsome species, and the only one yet introduced. It thrives in a compost of sandy loam and peat or leaf mould, and requires a moist atmosphere. Propagated by division, or by cutting up the short thick rhizomes into pieces, and starting them in bottom heat.

M. primulæflora (Primula-flowered). *fl.* deep bright pink, with a white eye and yellow anthers, 1in. in diameter; petals obovate or obcordate; peduncles two or three-flowered. November. *l.* 4in. to 6in. long, elliptic, acuminate; margins sinuate-toothed, ciliate; upper surface bright glossy green, lower and petiole red-purple. *h.* 6in. Columbia, 1069. SYN. *Bertolonia primulæflora* (of gardens). (B. M. 5818.)

MONOLOPHUS. Included under **Kæmpferia** (which *see*).

MONOLOPIA (from *monos,* one, and *lopos,* covering; referring to the structure of the involucre). ORD. *Compositæ.* A small genus (two species have been described) of pretty, hardy, woolly, annual herbs, natives of California. Flower-heads yellow, radiating, solitary, terminal; involucral scales in a single row; receptacle convex, naked. Leaves alternate, sessile or amplexicaul, entire or dentate. The culture is very simple, any ordinary garden soil being suitable. Propagated by seeds, sown in April, in a light soil.

M. major (greater). *fl.-heads* yellow. July. *l.* narrow, entire, or scarcely toothed. *h.* 2ft. California. 1834. A very showy plant, white or whitish with floccose wool, but sometimes glabrate and green. (B. M. 3839.)

MONOMERIA (from *monos,* one, and *meris,* a part; in reference to the single anther). ORD. *Orchideæ.* A small genus (two species) of stove epiphytal orchids, with abortive petals and a wide toothleted interval between the upper and lower sepals; they are allied to *Bulbophyllum.* The two species, *M. barbata,* from India, and *M. nitida,* from Mexico, are probably not now in cultivation.

MONOPANAX (from *monos,* one, and *Panax;* the plant resembling a *Panax,* and having a one-celled ovary). ORD. *Araliaceæ.* A genus founded by Regel on the plant here described. It is an ornamental, smooth-growing, dwarf stove shrub, with erect, simple stems, becoming leafless below. For culture, *see* **Aralia.**

M. Ghiesbreghtii (Ghiesbreght's). *fl.* greenish-white, in small, round, long stalked heads, on a terminal, pyramidal, racemiform panicle. *l.* long-stalked, digitate, bright green, composed of from four to seven lanceolate-oblong, acuminate, leathery, entire, stalked leaflets. Mexico, 1869. SYN. *Aralia Ghiesbreghtii* (of gardens). (R. G. 606.)

MONOPETALOUS. A term applied to those flowers in which all petals are more or less united. More correctly termed *Gamopetalous.*

MONOPHYLLOUS. Having only one leaf, or several leaves united by their edges into one.

MONOPSIS. This genus is included, by Bentham and Hooker, as a section of **Lobelia** (which *see*).

MONOSEPALOUS. Having only one sepal. More correctly *Gamosepalous.*

MONOTHYLACEUM. A synonym of **Hoodia** (which *see*).

MONOTOCA (from *monos,* one, and *tokos,* a birth; the edible fruit having only one seed). ORD. *Epacrideæ.* A genus comprising about half-a-dozen species of greenhouse evergreen shrubs or small trees, natives of East and South Australia. Flowers white, small, usually unisexual, disposed in racemose, axillary or terminal spikes, rarely solitary, sessile; corolla tube small, campanulate or scarcely cylindrical; lobes five or rarely four, valvate in bud. Leaves scattered, with recurved margins or nearly flat. The species described below are those best known to cultivation. For culture, *see* **Epacris.**

M. elliptica (elliptic). *fl.* white; spikes erect, nearly terminal and aggregate, or axillary and solitary. May to August. *l.* elliptic-oblong, four times longer than broad. *h.* 8ft. 1802. A small tree.

M. linearis (lined). A tall shrub or small tree, resembling *M. elliptica* in foliage; but the peduncles are shorter, axillary, and few-flowered, the flowers smaller, and the corolla more open. *h.* 6ft. 1804. Shrub.

M. scoparia (broom). *fl.* white; spikes axillary, few flowered, nearly sessile, nodding. May to August. *l.* oblong-linear, with revolute edges. Stems erect. *h.* 5ft. 1825. Shrub.

MONOTROPEÆ. An order of leafless herbs, parasitic on the roots of trees, principally Pines and Beeches, natives of the temperate regions of the Northern hemisphere. Flowers dirty white or pinkish, scented or inodorous, solitary, spicate, racemose. Leaves replaced by alternating scales. There are nine genera, and from ten to twelve species. Examples are: *Hypopithys* and *Pterospora. Hypopithys multiflora* (*Monotropa Hypopithys*), an interesting plant, is the only representative of the order in the British Flora. Like all the rest of the order, it is difficult to establish in gardens; the only way is to sow the seeds under Beech or Fir-trees.

MONSONIA (named after Lady Ann Monson, a correspondent of Linnæus). ORD. *Geraniaceæ.* A genus comprising about a dozen species of ornamental greenhouse herbs or sub-shrubs, of which four are natives of North-eastern Africa and tropical Western Asia, and the rest South African. Flowers regular; sepals and petals five, imbricated; peduncles axillary, one-flowered or umbellately many-flowered. Leaves alternate or opposite, stipulate, toothed or dissected. The species thrive in a sandy-loam soil, with a small quantity of peat and leaf

Monsonia—*continued.*

mould added. Propagated by seeds, sown in a slight hotbed, in spring; or by cuttings, inserted in sandy soil, under a handlight, in spring or autumn. The species here described are probably the only ones yet introduced.

M. lobata (lobed). *fl.* variegated with purple, red, white, and greenish on the outside, but pale bluish, with a darker base, inside; peduncles long, one-flowered, furnished with six or eight whorled bracts in the middle. Spring. *l.* cordate, five to seven-lobed; lobes blunt, serrated, pilose beneath. *h.* 1ft. Cape of Good Hope, 1774. Sub-shrub. (B. M. 385.)

M. speciosa (showy).* *fl.* rose-coloured, with a purple eye, greenish outside, large. Spring. *l.* palmately five-parted, with the segments finely bipinnatifid. *h.* 6in. Cape of Good Hope, 1774. Sub-shrub. (B. M. 73.)

MONSTERA (derivation unexplained by Adanson, who gave the generic name). SYNS. *Serangium*, *Tornelia*. ORD. *Aroideæ* (*Araceæ*). A small genus (about twelve species have been described) of curious and ornamental stove evergreen climbers, all natives of the West Indian Islands and tropical America. Spathe deciduous; spadix deciduous, female flowers below, hermaphrodite ones above; stamens of the upper flowers with flattened filaments, and two-celled anthers, opening by a short lateral slit. Leaves stalked, entire or perforated with holes, ultimately divided at the margin; petioles sheathed at the base. Monsteras thrive well if planted out on a well-drained mound of rich soil, against the damp wall of a stove, to which they firmly attach themselves by their long aerial roots. It is only in large structures that they can be allowed to develop at will; in smaller houses, they do well in pots. They are readily propagated by cutting up the stems.

FIG. 585. MONSTERA DELICIOSA.

M. Adansonia (Adanson's). *fl.* yellow, white; spathe boat-shaped. May. *l.* obliquely ovate-cordate, pertuse. West Indies, 1752. (B. M. 5086.)

M. deliciosa (delicious-fruited). *fl.* yellowish. Summer. *fr.* succulent, with a luscious pine-apple flavour. *l.* large, perforated in a singular manner, leathery. Mexico. A handsome plant for sub-tropical gardening. SYNS. *Philodendron pertusum*, *Tornelia fragrans*. See Fig. 585.

MONTAGNEA. A synonym of **Montanoa** (which *see*).

MONTANOA (called after Montano, a Mexican politician). SYNS. *Eriocarpha*, *Eriocoma*, and *Montagnea*. ORD. *Compositæ*. This genus comprises about fourteen species of shrubs, sometimes arborescent, rarely suffruticose, natives of North America, ranging from Mexico to Columbia. Flower-heads white, or sometimes pink, heterogamous, in corymbose panicles; ray-florets sterile; achenes glabrous, the hypogynous disk sometimes so

Montanoa—*continued.*

much developed as to resemble a cup-shaped pappus. Leaves opposite, entire, dentate, or broadly lobed; lower ones sometimes large, pinnatifid. Montanoas thrive in good fibrous loam, and succeed best in the cool conservatory. Propagated by seeds, sown in gentle bottom heat, in spring, and the seedlings gradually hardened off; or by cuttings of roots, inserted in autumn, and of the stems or shoots, in spring. These latter must be placed in a close, heated frame. *M. pinnatifida* makes a striking plant for summer sub-tropical gardening.

M. bipinnatifida (bipinnatifid).* *fl.-heads* yellow, in the apices of the branches, heterogamous; ray-florets ligulate; disk-florets tubular, funnel-shaped; receptacle convex, scaly. *l.* opposite, petiolate, bipinnatifid; lower ones pinnatifid, rigid, pilose; segments serrate. *h.* 6ft. to 8ft. Mexico. SYNS. *M. heracleifolia*, *Polymnia grandis*, *P. heracleifolia*. See Fig. 586. (R. H. 1863, 370.)

FIG. 586. MONTANOA BIPINNATIFIDA.

Montanoa—*continued.*

M. heracleifolium (Heracleum-leaved). A synonym of *M. bipinnatifida.*

FIG. 587. FLOWERING BRANCH OF MONTANOA MOLLISSIMA.

M. mollissima (very soft). *fl.-heads*, disk yellow; ray white. August to October. *l.* oval-lanceolate, sessile, deep dull green above, silvery-white and hairy beneath. A handsome branched shrub. Mexico. See Fig. 587.

M. tomentosa (tomentose). *fl.-heads* white, in compound corymbs; throat of corolla campanulate, about equalling the tube. September. *l.* cordate, oblong, toothed, tomentose, acute. *h.* 3ft. Mexico, 1828. (S. B. F. G. ser. ii. 44, under name of *Eriocoma fragrans.*)

MONTBRETIA. Now included under **Tritonia** (which *see*).

MONTEREY CYPRESS. *See* **Cupressus macrocarpa.**

MONTEZUMA (named after Montezuma, King of Mexico in the fifteenth century). ORD. *Malvaceæ.* A monotypic genus. The species is a very showy stove evergreen tree, with a spreading habit. It thrives in a compost of sandy loam and lumpy peat. Propagated by cuttings of rather firm shoots, inserted in sand, under a glass, in bottom heat.

M. speciosissima (very showy). *fl.* purplish-scarlet, large, with five somewhat sinuated petals; pedicels one-flowered, rising from the branches beneath the leaves. *l.* smooth, cordate, acute, entire, stalked. *h.* 30ft. Mexico, 1827.

MONTRICHARDIA (named after Gabriel Montrichard, of Trinidad). ORD. *Aroideæ* (*Araceæ*). A genus comprising three or four species of stove aquatic or marsh plants, natives of tropical America. Spathe thick, broad, ovate, acute, erect, convolute at base; spadix shorter than the spathe, sessile, acute, erect, thick, obtuse; inflorescence very dense, cylindrical. Leaves coriaceous, sagittate. Stems trunk-like. *M. linifera*, the only species yet introduced, thrives in a rich loamy soil, submerged, and in a moist atmosphere. Propagated by seeds, or by divisions of the rootstock.

M. linifera (thread-bearing). *fl.* greenish-yellow. *l.* stalked, sagittate-cordate; lobes rather acute. *h.* 3ft. to 12ft. Bahia, 1860.

MOON DAISY. A common name for *Chrysanthemum Leucanthemum.*

MOON FLOWER. A common name for *Chrysanthemum Leucanthemum.* The name is also applied to *Anemone nemorosa* and *Stellaria Holostea.*

MOON SEED. *See* **Menispermum.**

MOONWORT. *See* **Botrychium.**

MOQUILEA (from the name of one of the species in Guiana). ORD. *Rosaceæ.* A genus comprising about eighteen species of trees and shrubs, mostly natives of Brazil; they are also found in Guiana, Venezuela, the Trinity Islands, and Guadaloupe. The powdered bark of *M. utilis* (the Caraipi or Pottery-tree of Para), baked with an equal quantity of clay, makes vessels for domestic use capable of withstanding a great amount of heat. The species have no horticultural value.

MORÆA (named after R. Moore, an English botanist). Including *Vieusseuxia.* ORD. *Irideæ.* A genus comprising about forty species of hardy, or nearly hardy, bulbous plants, mostly natives of the Cape of Good Hope. They are closely allied to *Iris.* Flowers lilac or yellow, usually very brilliant, sweet-scented; perianth with three broad spreading or reflexed outer segments, and three narrower inner ones; stamens three, distinct; style slender, bearing three petal-like bifid or merely multifid stigmas opposite the stamens. Leaves few, narrow. The following is a selection of the species best known to cultivation; they are natives of the Cape, except where otherwise stated. Some of the species make very beautiful objects, when planted out in the cool conservatory. For culture, &c., *see* **Iris.**

M. bicolor (two-coloured). *fl.* yellow; outer perianth segments with a dark blackish-brown blotch at the base; scape erect, many-flowered, branching. Summer. *l.* pale green, narrow, ensiform, about 2ft. long. *h.* 2ft. (B. R. 1404; L. B. C. 1886, under name of *Iris bicolor.*)

M. bituminosa (bituminous). *fl.* yellow. April and May. *l.*, lower ones spirally twisted. Stem smooth. Branches viscid. *h.* 1ft. 1787. (B. M. 1045.)

M. bulbifera (bulb-bearing). A synonym of *M. ramosa.*

M. crispa (curled). *fl.* blue; segments spreading, the alternate ones smaller. May and June. *l.* about the length of the scape. *h.* 6in. 1803. (B. M. 759 and 1284.)

M. edulis (edible).* *fl.* violet; outer segments of the perianth with a yellow spot at the base. May. *h.* 4ft. 1792. (B. M. 613.)

FIG. 588. INFLORESCENCE AND FLOWER OF MORÆA IRIDOIDES.

Moræa—*continued.*

M. iridoides (Iris-like). *fl.* white, with yellow or brown spots. July. *h.* 6in. 1758. See Fig. 588.

M. papilionacea (butterfly-like). *fl.* varying from red to pale blue, spotted with dark blue. May. *l.* pubescent, all the segments spreading. *h.* 3in. to 6in. 1795. (B. M. 750.)

M. ramosa (branched). *fl.* golden-yellow, about 2in. in diameter. May. *l.* ensiform. Stems rigid, flexuous, leafy. *h.* 2ft. to 3ft. 1792. (B. M. 771.) SYN. *M. bulbifera* (B. M. 5785).

M. Sisyrinchium (Sisyrinchium). *fl.* purple or blue; tube filiform, very long. May. *h.* 6in. Mediterranean region, Orient, 1597. (B. M. 1407.) SYN. *Xiphion Sisyrinchium* (B. M. 6096).

M. spathacea (sheathed). *fl.* sweet-scented; perianth limb bright yellow; outer segments obovate-oblong, obtuse, 1½in. long, marked at the top of claw with a circle of purple lines; inner segments oblanceolate, rather shorter; pedicels 2in. to 3in. long. March. *l.*, developed ones not more than one to a stem, firm in texture, green, ensiform, 6in. to 24in. long, ¾in. broad, deeply channelled down the face, tapering to a long point; undeveloped ones numerous, scarious, dark brown, sheathing the outside of the tufts, the stems, and proper leaves. Stem terete, about 1ft. high, two or three-flowered. 1875. Plant rhizomatose. (B. M. 6174, under name of *Dietes Huttoni*.)

M. tricuspis (trident-petaled).* *fl.* pale greenish-white, with purple spots at the base of the outer segments; corolla rather large, with cuneate, concave claws; laminæ much longer than these, ovately rounded; inner segments equal to the claws of the outer. May. Stem simple, or occasionally with one or even two branches. *h.* 1ft. 1776. SYN. *Vieusseuxia tricuspis.* (B. M. 696.)

M. tripetala (three-petal-like). *fl.* bluish; outer segments of corolla sub-spathulate, divaricately patent; inner segments exceedingly small, shorter than the claws of the outer ones, patent. June. *h.* 1ft. 1802. SYN. *Vieusseuxia tripetaloides.* (B. M. 702.)

M. tristis (dull-coloured). *fl.* brown. May and June. *l.* very smooth. Stem, branches, and peduncles villous. *h.* 1ft. 1768. (B. M. 577.)

M. unguiculata (long-clawed).* *fl.* whitish, spotted with purplish-red; outer segments obovate, sub-acute, as long as the narrow claws; inner segments small, tridentate-partite. June. *h.* 1ft. 1802. SYN. *Vieusseuxia unguicularis.* (B. M. 593.)

MORCHELLA. *See* **Morel.**

MOREÆ. A tribe of *Urticaceæ.*

MOREL. This is the name given to a group of Fungi included in the genus *Morchella.* The species

FIG. 589. MOREL (MORCHELLA ESCULENTA).

grow chiefly in woods. Several species are distinguished, all of them edible; and some of them are regarded as great delicacies. They have a stalk, supporting a

Morel—*continued.*

head, which is rounded, oval, or conical, and externally very much wrinkled, and folded irregularly (see Fig. 589). In this surface are sunk numerous small bladders (asci), in each of which lie eight minute oval spores. The various kinds differ in proportions of stalk and head, but most are between 2in. and 12in. in height.

FIG. 590. LONGITUDINAL SECTION OF MORCHELLA ESCULENTA.

The general form and appearance are shown in Fig. 590, which represents the Common Morel (*Morchella esculenta*). This is one of the Fungi most esteemed for its excellent qualities. Its stem is 1in. to 3in. high, and the cap is 2in. or 3in. across. In colour it varies from yellowish to ash-grey. Its substance is somewhat firm, hence it can be easily dried and kept for winter use. In Germany, it is believed that Morels grow best in ground upon which forests have been burned, and this led to frequent burning the forests, till such actions were made severely punishable by law.

The Morel is used either fresh or in a dried state, much in the same manner as Truffles. It has not been subjected to cultivation, but specimens gathered when quite dry will keep for several months. They should not be collected in a wet state.

MORENIA. Included under *Chamædorea.*

MORETON BAY CHESTNUT. *See* **Castanospermum.**

MORICANDIA (named after M. E. Moricand, 1780-1854, an Italian botanist, author of "Flora Veneta"). ORD. *Cruciferæ.* A genus comprising five species of very pretty, hardy, annual or biennial, glabrous or pilose herbs, natives of South Europe, North Africa, and Western Asia. Flowers purple or rose, large; sepals erect. Pods often elongated, on upright pedicels. Leaves entire, and amplexicaul or pinnatisect. The species thrive in any light soil. Seeds should be sown, in the open ground, during spring, in a warm, dry situation.

M. arvensis (cornfield). *fl.* of a beautiful violet. Spring and summer. Pods somewhat tetragonal. *l.*, cauline ones cordate, stem-clasping, quite entire. *h.* 1ft. South Europe, 1739. Biennial. (B. M. 3007; S. B. F. G. iii. 278.)

Moricandia—*continued.*

M. Ramburii (Rambur's). *fl.* purple; calyx with the sepals erect, two opposite ones deeply bisaccate, two other opposite ones longer, and tapering to a mucronate point; racemes terminal, many-flowered. *l.* large, glaucous-green; lower ones largest, broadly obovate, petiolate; cauline ones gradually smaller and sessile. Stem 1ft. to 2ft. high, suffruticose below. Spain. Biennial. (B. M. 4947.)

FIG. 591. UPPER PORTION OF PLANT, RADICAL LEAF, AND FLOWER OF MORICANDIA SONCHIFOLIA.

M. sonchifolia (Sonchus-leaved).* *fl.* pale violet-blue, very showy, in terminal racemes, 1in. in diameter. March. *l.* sessile, acutely auricled at base; radical ones soon withering, lyrate-pinnatisect, sinuate-serrate; cauline ones obovate-oblong, subacute, sinuate-serrate. *h.* 1ft. to 2ft. China, 1876. Annual. See Fig. 591. (B. M. 6243.)

MORINA (named after Louis Morin, 1636-1715, a French botanist). SYN. *Asaphes.* ORD. *Dipsaceæ.* A genus comprising about eight species of glabrous or softly pubescent, hardy or half-hardy, perennial herbs, with the habit of *Carduus.* They are natives of Central and Western Asia. Flowers crowded in whorls in the axils of the floral leaves; corolla pink, long, tubular, ringent. Leaves oblong, sinuated, dentately spinose, rarely quite entire. The species thrive best in a little shade, and when sheltered from high winds. A sandy loam is most suitable. Propagated by dividing the roots, as soon as the plants have done flowering; the divisions then become established before winter sets in. The young plants should be placed in permanent quarters, and shaded, with leafy branches, for a fortnight. The two species described below are probably the only ones introduced.

M. Coulteriana (Coulter's).* *fl.-heads* pale yellow, in terminal spikes; bracts connate into a broad cup, rigidly spinous. *l.* narrow, spine-margined. *h.* 6in. to 18in. Western Himalaya, 1884. Hardy. (B. M. 6734.)

Morina—*continued.*

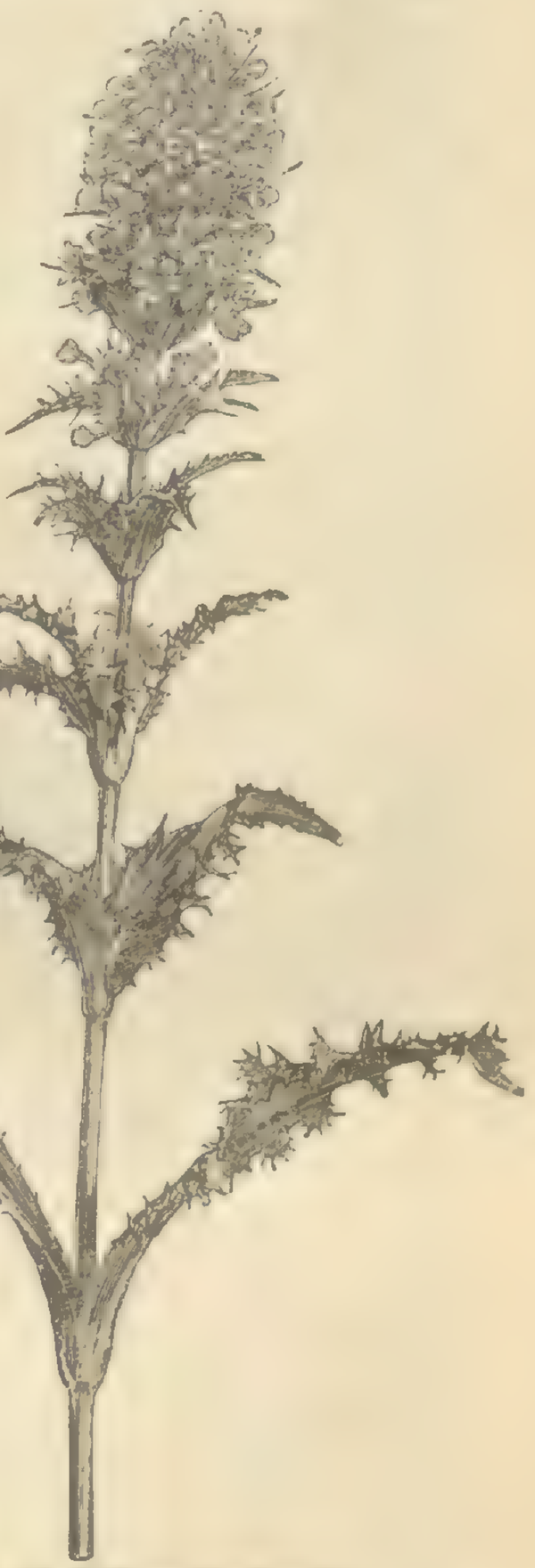

FIG. 592. FLOWERING STEM OF MORINA LONGIFOLIA.

M. longifolia (long-leaved).* *fl.-heads* white whilst in bud, changing to a delicate pink, and ultimately becoming a lovely crimson, 1in. long, and ¼in. across, disposed in crowded whorls in the axils of the upper leaves. June and July. *l.* about 1ft. long, 1½in. wide, pinnatifid, with wavy margins, somewhat spiny-ciliated. Stem terete, not furrowed. *h.* 2ft. Nepaul, 1839. Hardy. See Fig. 592. (B. M. 4092; B. R. xxvi. 36.)

MORINDA (from *Morus*, a Mulberry, and *Indica*, Indian). Indian Mulberry. SYN. *Sphærophora.* ORD. *Rubiaceæ.* This genus comprises about forty species of stove, erect or scandent, glabrous or rarely pubescent shrubs or trees, all natives of the tropics. Flower-heads usually white, long or shortly pedunculate; calyx tube urceolate, or hemispherical; limb short, truncate or obscurely dentate, persistent; corolla funnel-shaped or salver-shaped; tube short; throat glabrous or pilose; limb usually five-lobed, coriaceous, valvate. Fruit fleshy, consisting of the berries of the several flowers in a head, united into one compound berry. Leaves opposite, rarely three or four in a whorl. The species best known to cultivation are those here described. For culture, *see* **Hamelia.**

M. bracteata (bracteate). *fl.* pure white, disposed in small heads; corolla with a very villous throat; peduncles solitary. May. *l.* oblong, shining, on short petioles. India, 1816. A small tree.

M. citrifolia (Citron-leaved). *fl.* white, disposed in small heads; peduncles short, opposite the leaves, bractless. *tr.* combined into an ovate mass, creamy-white. *l.* oblong, attenuated at both ends, shining. Branches tetragonal. Tropical Asia, Australia, 1793. A small tree.

M. jasminoides (Jasmine-like).* *fl.* pale buff; peduncles axillary, forked, bearing two leaves and two capitula, each of from

Morinda—*continued.*

two to five flowers. April. *fr.* orange-coloured. *l.* lanceolate or elliptic, entire, shortly acuminated, sometimes undulated, with or without foveolated blotches in the axils of the nerves. Australia, 1833. A variable shrub. (B. M. 3351.)

M. tinctoria (dyer's). *fl.* pure white, with a Jasmine-like fragrance, in oval heads; peduncles opposite the leaves, solitary, much longer than the petioles. June. *fr.* green, like that of *M. citrifolia*. *l.* oblong, almost sessile, smooth, but not shining, from 6in. to 10in. long. India, Malay Archipelago, &c., 1826. The bark of the root of this species is used to dye red. Tree.

MORINGA (from *Muringo*, the Malabar name of *M. pterygosperma*). SYNS. *Anoma*, *Hyperanthera*. ORD. *Moringeæ*. This genus is the only one of the order (which *see* for characters). The species thrive in a sandy loam, with the addition of a little peat and leaf mould. Propagated, in May, by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in heat.

FIG. 593. PORTION OF INFLORESCENCE OF MORINGA APTERA.

M. aptera (wingless). *fl.* pale yellow, in axillary panicles, 9in. to 12in. long. Capsules about 1ft. long. *l.* 1ft. or more in length, with or without a few scattered obovate or oblanceolate leaflets, ¼in. to ¾in. long. *h.* 15ft. to 20ft. Nile Land, Upper Egypt, Syria, and Arabia. An oil is expressed from the seeds, and is largely employed in the manufacture of perfumery. See Fig. 593.

M. pterygosperma (winged-seeded). Horse-radish Tree. *fl.* pale yellow, the upper petal whitish. *l.* sub-pinnate. *h.* 20ft. India, 1793. The root of this tree, when young, is scraped, and used by the natives as the Horse Radish is in Europe.

MORINGEÆ. This order contains but a solitary genus—*Moringa*. Unarmed trees, inhabiting tropical Asia, Northern Africa, and the West Indies. Flowers irregular, in axillary panicles; calyx five-partite, with oblong sub-equal segments, imbricate in bud; petals five, inserted on the calyx, linear-oblong, the two posterior rather the longest, ascending, imbricate in bud. Leaves two or three, impari-pinnate; leaflets very caducous; stipules deciduous. There are only three species.

MORISONIA (named after Robert Morison, 1628-1683, born at Aberdeen, at one time Director of the Royal Botanic Garden at Blois, and afterwards Professor of Botany at Oxford). ORD. *Capparideæ*. A small genus (four species) of stove unarmed trees, natives of the West Indies and tropical South America. Flowers large or small; corymbs axillary and terminal, many-flowered. Berry globose. Leaves petiolate, simple, coriaceous, shining, glabrous, tomentose, or scaly. *M. americana*—probably the only species in cultivation—thrives in a compost of loam, peat, and sand. Propagated, in spring, by cuttings of the ripened shoots, inserted in sandy soil, under a glass, in bottom heat.

M. americana (American). *fl.* white, somewhat tufted; corymbs shortly-stalked, few-flowered. Berry 1½in. to 2in. in diameter. *l.* oblong, 4in. to 6in. long, glabrous, stalked, alternate, simple, bluntish; petiole thickish, often 1in. long. Branches and inflorescence leprous. *h.* 15ft. West Indies, 1824.

MORMODES (from *mormo*, a goblin; referring to the strange appearance of the flowers). ORD. *Orchideæ*. A genus comprising about fourteen species of stove orchids, inhabiting Columbia and Central America, as far as Mexico. They are allied to *Catasetum*, but are distinguished by the want of cirrhi upon the column, the lip being membranous, turned upwards, and often somewhat saddle-shaped; and the pollen-masses being four in number, connate in pairs, fixed to a thick caudicle, which adheres to a fleshy gland. Leaves elongate, plicate, veined. The species are more curious than ornamental. For culture, *see* **Catasetum.**

M. atropurpureum (dark purple).* *fl.* dark purple-brown, or between chocolate and blood-colour; sepals and petals ovate-lanceolate; lip porrected, velvety, with short hairs, tapering below into a stipes. October. *h.* 1ft. Panama, 1834. (B. M. 4577; B. R. 1861.)

M. buccinator (trumpeter).* *fl.* pale reddish-brown, everywhere sprinkled with dark-coloured dots; sepal and petals oblong-acute, with margins singularly recurved; lip large, fleshy, with revolute side, almost like the flaps of a saddle; column shorter than the lip. April. *l.* 9in. long, lanceolate, membranous, striated. *h.* 1ft. to 1½ft. Central America. (B. M. 4455, under name of *M. lentiginosum*.)

M. Cartoni (Carton's). *fl.* numerous, in a rather long oblong spike; sepals and petals yellow, streaked longitudinally with red, similar in shape and size, much spreading, almost reflexed; lip equal to the petals, but twisted, also pale yellow, with a few interrupted streaks; columns slightly oblique. July. *l.* three or four, 1ft. or more long. *h.* 1ft. Santa Martha. (B. M. 4214.)

M. colossus (colossal). *fl.* from 5in. to 6in. across; sepals and petals narrow-lanceolate, spreading or reflexed, pink at the base, passing into yellow at the tips; lip ovate, bright yellow; raceme many-flowered. *l.* elliptic-ovate. Central America, 1870. (B. M. 5840.)

M. Greenii (Green's). A synonym of *M. uncia*.

M. igneum (fiery). *fl.* red, purple. January. *h.* 2ft. Central America, 1852.

M. lentiginosum (freckly). A synonym of *M. buccinator*.

M. lineatum (lined). *fl.* dull olive-green, increasing with maturity in intensity of colouring; lip variable, but always covered with loose, straggling hairs. March. Guatemala, 1836. (B. R. xxviii. 43.)

M. luxatum (dislocated). *fl.*, sepals and petals creamy-white; lip of the same colour, with stripes of brown in the centre; peduncle many-flowered. July. *l.* broad. Mexico, 1842. A handsome species. (B. R. xxix. 33.)

M. Ocanæ (Ocana).* *fl.* dark orange-yellow, closely speckled with red-brown spots, about 3in. in diameter when spread out; sepals and petals concave, spreading; lip with a long claw; racemes six to ten-flowered. October. *l.* 1ft. long by 1½in. broad, narrowly-lanceolate, acuminate. Pseudo-bulbs elliptic-oblong. Columbia, 1879. (B. M. 6496.)

M. pardinum (panther-spotted).* *fl.*, sepals and petals bright yellow, spotted with rich brown. July. Mexico, 1837. A handsome species, rarely seen in cultivation. (B. M. 3900.)

Mormodes—*continued.*

M. p. unicolor (whole-coloured). *fl.* deep lemon-yellow, in many-flowered racemes; sepals and petals ovate, acuminate, concave; lip cuneate, with three acuminated lobes, the two lateral ones smaller and reflexed; scape 1ft. and more long. September. *l.* lanceolate, membranous, strongly striated. (B. M. 3879.)

M. uncia (uncial). *fl.* whitish externally, 2½in. in diameter; inner surface of perianth pale yellow, covered with dark red spots; base of lip dark purple, the inner surface yellow, with red streaks; column green inside, curved; raceme large, pendulous, many-flowered; powerfully aromatic. June. *l.* narrow-lanceolate, 1ft. to 1½ft. long. Pseudo-bulbs somewhat two-edged. Mexico, 1869. (B. M. 5802, under name of *M. Greenii*.)

M. Williamsii (Williams'). *fl.* creamy-white, sweet-scented; spikes twelve to fifteen-flowered. Mexico. A handsome species.

MORNA. Included, by the authors of the "Genera Plantarum," under **Waitzia** (which *see*).

MORNING GLORY. A common name for the genus *Ipomœa*.

MORONOBEA (from Moronobo or Coronobo, the Caribbean name of *M. coccinea*). ORD. *Guttiferæ*. A genus comprising but one (or perhaps two) species. *M. coccinea* is a tall tree, with the habit of *Platonia*. It requires a compost of sandy loam and moderately rough leaf mould. Propagated by cuttings of the ripened shoots, inserted, with the leaves intact, in sand, under a bell glass, in heat.

M. coccinea (scarlet). Hog Gum-tree. *fl.* white, large, terminal, solitary, hermaphrodite; sepals five, imbricated; petals five, much exceeding the calyx. May. *l.* oblong, acute at both ends, with an incurved point, coriaceous, dotless. *h.* 40ft. Guiana, 1825. A fluid pellucid juice issues from incisions in the trunk, which hardens into a valuable medicinal resin. It is said that, in Jamaica, hogs, when injured, rub themselves against the tree, in order to become smeared with the juice—hence the common name.

MORPHIXIA. Included under **Ixia** (which *see*).

MORUS (the old Latin name for the Mulberry). Mulberry. ORD. *Urticaceæ*. Some ten or twelve species have been referred, by various authors, to this genus; these may probably be reduced to about five. They are milky-juiced, mostly hardy deciduous trees or shrubs, extending over the temperate regions of the Northern hemisphere, and also found on tropical mountains. Flowers greenish-white, inconspicuous, unisexual, borne in separate, axillary, catkin-like spikes. Fruit oblong, juicy, composed of numerous egg-shaped, compressed achenes covered by the enlarged succulent calyces. Leaves alternate, toothed, entire or three-lobed, three-nerved at base; stipules lateral, small, caducous. *M. alba* and *M. rubra* grow well in almost any rather dry soil, the latter being the hardier of the two. Propagated freely by cuttings, which may be inserted in a shady border in spring or autumn. The species here given are those best known to cultivation, and are all hardy. For cultivation of *M. nigra*, *see* **Mulberry.**

M. alba (white). White Mulberry. *fl.* greenish-white. May. *fr.* white or pale red; ripe in September; inferior to the Black in flavour, being less brisk and sharp. *l.* with a deep scallop at the base, and either cordate or ovate, undivided or lobed, serrated with unequal teeth, glossy; basal sinus equal. *h.* 20ft. to 30ft. Asia, 1596 (naturalised in many countries). There are a great many varieties of this species, those grown in Lombardy and other parts of Italy being the most esteemed. In Europe, the White Mulberry is most generally cultivated for its leaves, which are used for feeding silkworms.

M. nigra (black). Common Black Mulberry. *fl.* greenish-white. June. *fr.* oblong, red or black; ripe in August. *l.* cordate, bluntish, or slightly lobed with about five lobes, unequally toothed, rough. *h.* 20ft. to 30ft. Orient, 1548. This species is cultivated on account of its very wholesome and refreshing fruit; and also for the leaves, which are used for rearing silkworms. (B. M. Pl. 229; W. D. B. ii.159.) *See also* **Mulberry.**

M. rubra (red). *fl.* greenish-yellow. July. *fr.* red, long, pleasant to the taste; ripe in September. *l.* cordate-ovate, acuminate, three-lobed or palmate, serrated with equal teeth, rough, somewhat villous; under surface very tomentose and soft. *h.* 40ft. to 70ft. Northern United States, 1629.

MOSCHARIA (from *Moschos*, Musk; alluding to its fragrance). SYNS. *Gastrocarpha*, *Mosigia*. ORD. *Compositæ*. A monotypic genus, similar in habit to *Sonchus*,

Moscharia—*continued.*

with the involucre of five or six spreading leafy bracts, and the pappus consisting of very short lanceolate, ciliate, chaffy scales. The species is an erect, hardy annual, of easy culture in ordinary soil. Seeds should be sown in April, in a gentle heat, and the plants transferred to the open borders in May or June.

M. pinnatifida (pinnatifid). *fl.-heads* white, in loose panicles at the apices of the branches, shortly pedunculate; involucre sub-globose; receptacle small, convex. July. *l.* alternate, pinnatifid. *h.* 6in. Chili, 1823. (B. R. 1564; S. B. F. G. 229, under name of *Gastrocarpha runcinata*.)

MOSIGIA. A synonym of **Moscharia** (which *see*).

MOSSES (*Musci*). These are well-known to everyone, at least as regards their general appearance. They possess distinct leaves and stems, the latter bearing below root-hairs, which act as roots for their benefit. All parts of the plants are made up of cells, without vessels among them; but some cells are long, and form a kind of central thread in the stem, and also a mid-rib in each leaf. Mosses vary in size from a little over ⅓in. (*Buxbaumia*) to several feet in length of stem (*Fontinalis*), but usually range between ¼in. and an inch or two high. The leaves are always small, and are usually numerous. If the life history of any Moss be traced out, it will be found to be nearly as follows, if we commence with one of the minute one-celled spores. The spore pushes out a fine filament, which branches, and forms buds here and there on the branches; each bud grows larger, and forms a plant with stem and leaves. On this plant, at certain periods, grow parts that correspond in use to the young seeds (ovules) and the pollen of flowering plants. From their union, there results the so-called fruit of the Moss, or the capsule, usually supported on a stalk. The capsule, with its stalk, is really a new plant, imbedded by the base in the leafy plant, and nourished by absorbing sap from it. The capsule has usually a rod of tissue running up its centre, with a space all round between this and the sides, and in this space are formed the spores. When the spores are ripe, they are set free, either by slits formed in the sides of the capsule, or, more often, by a lid (operculum) falling off. Below this lid, there is usually a row (at times two rows) of membranous teeth, always in multiples of four, forming the peristome. In the classification of Mosses, considerable stress is laid on the nature of the peristome, and of its teeth.

Uses. The direct uses of Mosses to mankind are very few. In gardening operations "Moss" is largely used to maintain moisture around plants in pots, &c., or epiphytes, such as many tropical Orchids. This is a Sphagnum, or Bog Moss, a genus of which numerous species and varieties occur in Britain. Its peculiar power of absorbing moisture is due to many of the outer cells having openings into them, so as to permit free ingress and egress of the water, which is sucked up by the Moss, just as in a sponge. Sphagnum is also an excellent material for packing fragile articles which it is necessary to send, by train or by other means, to a distance. The various kinds of Sphagnum love low, swampy ground; they aid much in the formation of peat. Other uses of Mosses are but few and unimportant. Brushes are at times made of the stems of Hair Moss (*Polytrichum*).

Injuries. Direct injuries to man from Mosses are even fewer than direct benefits; but harm in gardens may result from Moss on trees, and on gravel walks, or on the soil of gardens, lawns, &c. Moss on gravel walks generally indicates damp sub-soil; good drainage is therefore essential for its prevention. If it appears, it may be kept within bounds by loosening the surface. Watering with a solution of copper sulphate (blue vitriol), or of corrosive sublimate, is useful if the walk is not of large extent. Moss on garden soil, and on lawns, is very hurtful in crushing out the plants that are of use, or are

Mosses—*continued.*

ornamental. Mosses do not thrive well in fully-drained soils, hence the drainage ought to be at once seen to when these plants begin to be troublesome in gardens. The soil may advantageously be top-dressed with lime, or with mixtures of lime and sulphur, or of soot and salt, or with compounds of ammonia, *e.g.*, ammonium sulphate (½lb. to 1 gallon of water). Mosses and Lichens on trees may prove hurtful if closely covering the bark, since they keep it too moist, thus promoting the growth of parasitic Fungi under their shelter; and this may result in the death of the branches. Mosses and Lichens may also give shelter to parasitic insects, especially to Aphides, and to various Larvæ during winter. The plants of Moss and Lichen themselves, probably, do not absorb any nourishment from the trees; yet, for the above reasons, they should be removed. This may be done by vigorous brushing after rain has fallen pretty heavily for some hours, as they are more loosely attached while soaked. The branches should be then well washed with a solution of soft soap and lime. Dead branches loaded with Lichens and Mosses should be removed. Newly-slaked lime may be scattered among the overgrowth with advantage. Excessive growth of such plants on branches of trees may be a good deal lessened by judiciously thinning plantations, and by pruning the individual trees, so as to insure free access of air and light.

MOTHER OF THOUSANDS. *See* **Linaria Cymbalaria.** The name is also applied to *Bellis perennis prolifera* and *Saxifraga sarmentosa*.

MOTH, FLAT-BODY. *See* **Flat-body Moth, Common.**

MOTHS (*Heterocera*). Under this name are denoted such of the order *Lepidoptera*, or scale-winged insects, as are not included among the Butterflies (*Rhopalocera*). (*See* **Insects** for the characters that distinguish *Lepidoptera* from other insects.) Butterflies are a far more uniform group than Moths, and differ from them in having the antennæ, or feelers, almost always clubbed at the tip, but elsewhere slender. *Rhopalocera* means club-horned. Their wings are usually folded back, when at rest, so as to display the lower surface, which often bears bright colours; and the body is usually slender. Moths, on the other hand, have the antennæ sharp-pointed, with no club, but otherwise variable, being branched, slender, feathery, or of some other form. *Heterocera* means varied-horned. Some have the body slender, and the wings folded, as in Butterflies, in which case, the lower surface is seldom conspicuously coloured; but usually the body of the insect is heavy, without marked distinction between the middle body (thorax) and the hind body (abdomen); and the wings are usually folded flat on the back, the hind wings being so folded, lengthwise, as to lie entirely below the narrower fore-wings when at rest. In almost all, the two wings on each side are connected by a bristle, or a tuft of stiff hairs, that projects from the front edge of the hind wing, and plays in a kind of socket or ring on the fore-wing. It is more difficult to state any constant differences between the caterpillars of Butterflies and Moths than between the perfect insects, though it is usually possible for a practised entomologist to distinguish the groups even in this stage; and so also with the pupæ.

Moths are of far greater practical importance than Butterflies, for the caterpillars of several species do very serious injury to fruit-trees, to potherbs, and to other cultivated plants. It is possible to ward off, or at least to lessen, the evil done by such species in some cases; but in others the insects are so well protected in the leaves, or other parts of plants, as to render remedial measures practically hopeless; and the affected parts, or the entire plants, must be destroyed to prevent extension of the injury.

Moths—*continued.*

There is usually little difficulty in recognising the caterpillars of *Lepidoptera*, the only other group of insects in which somewhat similar larvæ are found being the Sawflies, among the *Hymenoptera*. But, while they retain a strong general likeness, they yet vary exceedingly in many points, such as the number of prolegs, or fleshy legs, on the hinder rings of the body; the colour and markings; and the skin, in some smooth, in others warty, or covered with hairs, bristles, or long spines. Nor are they less varied in their habits and modes of life, though, with few exceptions, they feed on, or in, living plants. The larvæ of a great majority of the Butterflies, and those of many Moths, live on the surface of the leaves, or other organs of their food-plants, exposed to full view. Frequently, such exposed larvæ are brightly coloured; but, on experiment, it has often been found that they are distasteful to birds, because of unpleasant fluids thrown out by them, or of the hairs or spines on their bodies. The caterpillars of most Moths feed hidden from view in some way. The concealment is secured, by some, by hiding below the soil, or in crevices, during the day, and crawling out to feed only during night. Others roll up leaves, or spin two or more together, and feed in shelter of the cover so formed; while others combine to form large webs (*see* **Hawthorn Caterpillars**), in which they lie, and feed protected. Many others bore into the roots or stems of plants (*see* **Leopard Moth**), or between the surfaces of leaves (*see* **Leaf Miners**), and thus find food, as well as protection. A few others, chiefly small kinds, prefer dead and dried vegetable or animal products, such as corn, peas, woollen cloths, bees' combs, &c.; and these are frequently very troublesome in houses.

The methods of remedying injuries caused by larvæ of Moths, and of preventing future attacks, must depend largely on the habits of the insects, both in the perfect and the larval stages of development. They are mentioned under **Insects** (which *see*), and under special tribes or genera, noted below. Moths pass through a complete metamorphosis. The larvæ seek out safe retreats in which to become pupæ, or chrysalides. These retreats may be in crevices, or in the galleries made by them in the plants; or among dead leaves; or under the soil, in earthen cells, lined with silk. Less often they spin a silken cocoon, in some exposed situation, and trust to this covering for their protection. The pupæ are defenceless, with the limbs all firmly bound down to the body by a hard shell or coating of chitine. The only power of motion they possess is that of wriggling some of the hinder rings of the body. In the pupa-case the Moth becomes fully developed; it then bursts the case, along the front half of the back, and crawls out, with the wings small and soft at first. But these organs at once begin to grow, and in an hour or two they reach their full size, and soon become firm, and fit for flight.

The females of various kinds of Moths (*see* **Hybernia**) never have the wings useful for flight; but in them the wings remain small, or may even be entirely absent. Moths form several well-marked tribes; though these grade into one another in such a way that it is difficult, at times, for a beginner to distinguish to which tribe certain individuals belong. The more reliable distinctive characters of the groups are noted below.

Most kinds of Moths can be reared with comparative ease, from the larval state, in confinement; hence, the life-histories of these insects are far more thoroughly known than those of any other group. But it would be beyond the scope of this work to enter on the methods of rearing, capturing, and preparing Moths for permanent preservation, despite the interest of such pursuits.

Moths are divided into two great sections: the *Macro-*

Moths—*continued.*

lepidoptera (meaning large scale-winged insects), seldom under 1in. across the outspread wings, and often much larger; and the *Microlepidoptera* (or small scale-winged insects), seldom exceeding 1in. across the wings (except in *Pyralidina*), and often much smaller. In both sections there are numerous species that injure cultivated plants. Each section includes several tribes, which are generally more or less characterised by the habits of the larvæ, as well as by peculiarities in the structure of the perfect insects. The following are the more important tribes and families:

1. *Sphingina*, or the Hawk Moth tribe, including the true Hawk Moths, the Humming Bird Hawk Moths (*see* **Macroglossa stellatarum**), and the Clear-wing Moths.

FIG. 594. HUMMING BIRD HAWK MOTH.

They all have long, narrow, front wings (see Fig. 594), which they move rapidly; and fly in a peculiar fashion. They have a long proboscis, or trunk; and their antennæ are thick in the middle, and taper to both ends. The larvæ of the true Hawk Moths are seldom very hurtful to garden plants,

FIG. 595. DEATH'S HEAD MOTH.

though that of the Death's Head Moth (Fig. 595) feeds on Potato, on Jasmine, and on *Lycium barbarum*; that of the Privet Hawk Moth on Privet, and those of the genus *Smerinthus* on Willows, Poplars, Apple, Lime, &c. They often have a straight or curved horn, or tail, at the end of the body. The Clear-wing Moths, as larvæ, live in burrows, in the roots and stems of many plants, and often do considerable damage—*e.g.*, *Sesia tipuliformis* in Currant branches, and *S. apiformis* (see Fig. 596) in Poplars.

2. The tribe *Bombycina* includes a considerable number of Moths, usually of large size, with heavy bodies. Their wings are relatively weak, so that they—at least, the females—are not very active on the wing, and the females of some kinds are practically wingless. They usually have the proboscis small, and hardly fit for

Moths—*continued.*

sucking up food. The males often have the antennæ feathered largely on both sides; the antennæ of the females, on the other hand, are usually slender. They mostly fly by day, and are often brightly coloured. The larvæ are very frequently hairy and brightly coloured.

FIG. 596. CLEAR-WING MOTH.

Many of them are very hurtful to garden produce. The Silkworms (*i.e.*, larvæ that produce silk for their cocoons in such quantity as to be of commercial importance) belong to this tribe, and chiefly to the genera *Bombyx* and *Saturnia*. *Bombyx mori* is the common Silkworm Moth. Among the many species of this tribe that might be noted, we shall here mention only a few, concerning which fuller information will be found under the respective names. They are: Brown-tail, Gold-tail, and Gipsy Moths (*Liparis*, see Figs. 597 and 598); Lackey Moth (*Bombyx neustria*, see Fig. 599), Tiger Moths (*Arctia caja* and *A. villica*, see Fig. 600), and Vapourer Moth (*Orgyia antiqua*, see Fig. 601).

Nearly related to the true *Bombycina*, and often included among them, are the Ghost Swifts (*Hepialidæ*), of which the commonest species (*Hepialus humuli*) feeds, in the larval state, in the roots of many plants, and is at times very hurtful to the Hop. The larvæ are smooth, and dull ochreous in colour. The moths have very short, slender antennæ. Closely allied to the *Hepialidæ* are the *Zenzeridæ*, represented by the Goat Moth (*Cossus ligniperda*) and the Leopard Moth (*Zenzera æsculi*); the larvæ of both feed in the wood of trees. The *Notodontidæ*, or *Pseudo-bombyces*, are frequently separated off as a family distinct from the true Bombyces, from which, however, they differ in no very important respect. The larvæ of this family are frequently of very strange forms, with humps, or warts, or long filaments at the tip of the body, as in the Puss Moth. They mostly live on trees, and the only species among them that is common enough to be injurious to any extent is the Buff-tip Moth (*Pygæra bucephala*), which feeds on almost any of our native, as well as on many cultivated, trees.

FIG. 597. GIPSY MOTH (MALE)

3. The next great tribe is *Noctuina*, or Night Moths, so called because of their generally flying by night. In this tribe the antennæ are almost always slender; the

Moths—*continued.*

front wings are rather narrow, the hind wings broad, and folded lengthwise. On each front wing are usually two spots, the inner round (orbicular stigma), the outer kidney-shaped (reniform stigma); and there are often two or more light cross lines. The hind wings are frequently

FIG. 593. GIPSY MOTH (FEMALE).

unspotted (see Fig. 602). The body is usually thick and heavy. The colour of the whole insect is usually dull, though often the markings are very elegant when examined closely. A few *Noctuæ* are brightly coloured, or bear metallic spots on the wings. The larvæ are usually smooth-skinned and dull in colour, or are marked with bright lines, and spots occasionally. They generally

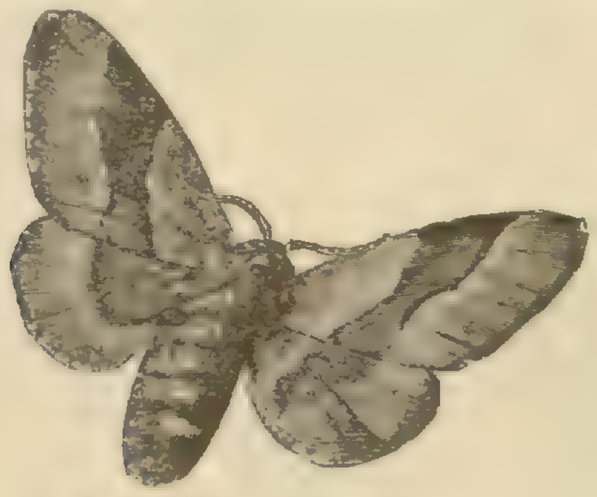

FIG. 599. LACKEY MOTH.

have five pairs of prolegs, though, in a few genera (*Plusia*, &c.), the middle pairs of prolegs are small, or absent, forming a transition to the next tribe. Many of the larvæ are most hurtful to garden produce. They usually go underground to change into pupæ. *See* **Mamestra, Noctua, Plusia,** and **Potherb Moths.**

4. The *Geometrina*, or Looper Moths, are readily distinguished from all others, except the few *Noctuæ* men-

FIG. 600. TIGER MOTH.

tioned above, by the larvæ being long and slender, and moving in a peculiar manner, known as looping. This is caused by the fact that the middle pairs of prolegs are useless, or are entirely wanting. Usually only the pairs on the last two rings of the body are present, and the caterpillar, in moving along, has to bring the hinder extremity forward before fixing it and pushing forward the anterior part with the three pairs of true legs. Every step thus throws the body into a loop. The moths resemble butterflies in their slender bodies, and in the size and form of the wings, as well as in their usual attitude when at rest. The proboscis in them is usually small, or wanting. The antennæ are slender, or may be

Moths—*continued.*

comb-like in the males. The colours are mostly dull, often with very elegant lines or bars, but with neither stigma on the wings; a few are bright in colour. In a few genera, the females are nearly, or quite, wingless. The pupæ are usually concealed underground, in earthen cells. The larvæ usually feed exposed, or may spin leaves together, to obtain protection against danger from without. The Looper Moths are far less widely hurtful than the *Noctuæ*, yet several species may be found referred to more at length under **Gooseberry or Magpie Moth, Hybernia,** and **Winter Moth** (which *see*).

A knowledge of many of the *Microlepidoptera*, despite their very small size, is of great importance to gardeners, since they injure extremely the leaves and other parts of plants. The three great tribes of this group are as follows:

FIG. 601. VAPOURER MOTH.

1. *Pyralidina*. In this tribe are contained the largest of the *Micros*; but they seldom do much injury to garden produce, hence they need not be dwelt on here. They frequently approach small *Noctuina* in habit and appearance.

2. *Tortricina*, or Leaf Roller Moths, are a very numerous group of small Moths, ½in. to 1in. in spread of wings. The front wings are broad, with the front margin close to the base peculiarly arched; and one overlaps the other when folded. In colour, the front wings are frequently green, brown, rusty-brown, yellow, &c.,

FIG. 602. POTHERB MOTH.

or are marked with peculiarly elegant spots or lines. Their palpi are short and inconspicuous; their larvæ are like those of *Noctuina*, save in size, and possess, generally, five pairs of prolegs. They live, for the most part, between leaves, spun together, or rolled into tubes. *See* **Leaf Rollers.** The larvæ are very agile, dropping from their tubes at once when a bird tries to catch them there. Many of them are more or less injurious

FIG. 603. CODLIN MOTH.

to trees, and to cultivated plants, *e.g.*, the Codlin Moth (*Carpocapsa pomonana*, see Fig. 603), and the genus *Tortrix*.

3. *Tineina* is a tribe of very wide numerical extent. It includes the smallest of the Moths, some of the species being extremely minute. They differ from *Tortricina* in having narrow wings, with long hind fringes; a slender body; proboscis very small, or absent; palpi long, prominent, and ascending; and the hind feet customarily long, and furnished with spurs; eyes naked. These Moths vary extremely in colour, their beauty of colouring under a microscope, being frequently unsurpassed in insects. The larvæ are usually smooth, or nearly so, and of the ordinary form. They vary much in number of prolegs; five pairs is their usual number, but, in a few, there are six ill-formed pairs; in others, there are four pairs; and others are almost footless. The larvæ also vary

Moths—*continued.*

very much in their habits, some feeding exposed, others in rolled, or in mined leaves, or in clothes; and a good many make, and carry around, neat cases, for their protection from injury. Some kinds do considerable injury to the crops and to trees; but the *Tineina*, as a whole, are far more injurious to field crops than to gardens. The pupæ are usually protected, as in *Tortricina*, in a web, or cocoon, spun by the larvæ among their food. *See* **Hawthorn Caterpillars.**

Pterophorina and *Alucitina*, or the Plume Moths, are small Moths, in which each wing is divided, lengthwise, into from two to six segments, or "plumes," resembling small feathers. They are of small size, and do little harm to cultivated plants, or to field produce in general.

MOTTLED UMBER MOTH. *See* **Hybernia.**

MOULD. This term is frequently used, very vaguely, to denote a large number of microscopic Fungi that agree in being filamentous in structure, and in having the spores usually borne on the tips of certain branches, sometimes scattered, at other times crowded in masses, the arrangements of which are of importance in affording means of distinguishing the various kinds of Moulds. The Fungi included under the name are exceedingly numerous, and belong to widely different groups. Many of them live on decaying remains of animals, or of plants that remain damp; indeed, it is scarcely possible to prevent their growth in food, clothes, and other household articles in damp houses. But, in addition, many kinds also grow upon living plants, and are most destructive at times in their attacks upon certain of them; *e.g.*, *Peronospora infestans*, on Potatoes; *P. gangliformis*, on Lettuce, &c. Only these latter kinds very greatly concern gardeners. The injurious kinds will be found treated of under the headings of the plants injured by them.

Moulds are often divided into two groups, viz., the Black (*Dematiei*), having the threads dark because of thickened cell-membranes; and the White (*Mucedines*), which have no thick cell-membranes, and cannot always be clearly distinguished from the Mildews (*see* **Mildew**). It is to the White Moulds that the more harmful kinds belong, particularly to the genus *Peronospora*. A good many of the Moulds, we have reason to believe, are only earlier stages of Fungi that belong to groups more complex in structure when mature; whilst a considerable number have the power of producing spores that, when lying in fluid which contains sufficient food, resemble the Yeast Fungus in appearance, in the mode of forming new cells, and in causing fermentation in the fluid if it contains fermentable substances. Good ventilation, and prevention of overcrowding, are essential in diminishing the risk of injury from Moulds to greenhouse subjects. Direct applications to plants containing parasites inside their tissues are useless, since the parasite cannot be reached, and the host-plant itself suffers. It is advisable to destroy diseased plants by fire, if practicable; and seed should not be taken from these. Plants of dry soils are less liable to damage from injury by Fungi than are those in damp situations. Lastly, the healthier the subject, as distinct from mere luxuriance, the less likely will it be to suffer injury from the growth on it of Moulds.

MOULDING, or EARTHING-UP. The process of adding or drawing soil round the base of certain plants, more especially kitchen garden crops, either for the purpose of blanching their stems, or for insuring a greater depth above the roots, and in the limited space occupied by them in comparison with the tops. Moulding, or Earthing-up, is invariably attended with good results when practised amongst Beans, all the plants of the *Brassica* tribe, Peas, Potatoes, &c. It is usually performed when the different subjects have become established, and are growing freely.

MOUNTAIN ASH. *See* **Pyrus Aucuparia.**

MOUNTAIN AVENS. A garden name of **Dryas octopetala** (which *see*).

MOUNTAIN EBONY. *See* **Bauhinia.**

MOUNTAIN HOLLY. *See* **Nemopanthes.**

MOUNTAIN PARSLEY FERN. *See* **Cryptogramme.**

MOUSE-EAR CHICKWEED. *See* **Cerastium.**

MOUTAN PÆONY. *See* **Pæonia Moutan.**

MOVING PLANT. *See* **Desmodium gyrans.**

MOWING MACHINES. *See* **Lawn Mowers.**

MUCILAGE. A turbid, shiny fluid.

MUCRO. A small, sharp point.

MUCRONATE, MUCRONULATE. Abruptly terminated by a hard, sharp point.

MUCUNA (its Brazilian name). SYNS. *Carpopogon*, *Macroceratides*, *Negretia*, and *Stizolobium*. Including *Macranthus*. ORD. *Leguminosæ*. A genus comprising about twenty-two species of herbs, or tall or rarely short and erect twining shrubs, chiefly inhabiting tropical Asia and America, a few tropical African, and one from the Fiji Islands. Flowers purple, red, or greenish-yellow, showy, in axillary racemes. Leaves pinnate, trifoliolate, often stipellate. The species are but rarely seen under cultivation, except in botanic gardens. They are strong-growing climbers, requiring to be planted out in good loam, in some warm house, and the long shoots trained near the glass. Propagated by cuttings of half-ripened young wood, inserted under a bell glass, in bottom heat; or by seeds. The pods of *M. pruriens* and *M. prurita* afford the Cowage, Cowhage, or Cow-itch of the Materia Medica.

M. imbricata (imbricated). *fl.* large; vexillum of corolla not half the length of the keel, varying from dirty white to purple; wings dark purple, shorter than the keel: keel cylindrical nearly to the end, where it curves upwards and terminates in a sharp spiny point; racemes large, thyrsiform, drooping, having the appearance of bunches of black grapes. Legume 3in. to 4in. long, about 1in. broad, bent at the extremities, covered with white hairs, which turn black in drying. *l.* ternate, trifoliolate, nearly glabrous above, silvery (with hairs) and prominently veined beneath. India. Stove. (B. M. 4945, under name of *M. prurita*. The true *M. prurita* is altogether a different plant.)

MUD PLANTAIN. *See* **Heteranthera reniformis.**

MUEHLENBECKIA (named after Dr. H. G. Muehlenbeck, 1798-1845, a Swiss physician.) SYN. *Sarcogonum*. ORD. *Polygoneæ*. A genus comprising about fifteen species of greenhouse or hardy, often climbing, shrubs or sub-shrubs, natives of Australia, New Zealand, the Pacific Islands, and extra-tropical South America, or the Andes. Flowers small, within sheathing fasciculate bracts; fascicles sometimes solitary in the axils, often in short, axillary or terminal, simple or paniculate, spikes or small racemes; perianth five-fid. Nut obtuse or acutely trigonal. Leaves alternate, petiolate, sometimes small and sub-orbiculate, sometimes large and cordate, deltoid, or sagittate. Only three species call for description in this work. *M. complexa* is a hardy climber of great beauty. It enjoys a sunny position, and well drained or sandy soil, and makes an effective subject for the upper and drier parts of the rockwork, where it forms a dense prostrate bush. In habit, it is dense and diffuse, and, from the distinct form and colour of its foliage, together with the graceful shape of the spray-like branches, it is most desirable and valuable for cutting purposes. All the species are propagated by cuttings, which should be taken in early summer, becoming thereby nicely rooted before winter sets in; the hardy ones may be put in any shady position out of doors (though a frame is preferable), and the greenhouse species planted in pots in heat.

M. adpressa (adpressed). *fl.* pink, small, in many-flowered, panicled spikes. Nut black, trigonous. *l.* ½in. to 2in. long, petioled, cordate or broadly oblong and truncate at base, obtuse,

Muehlenbeckia—*continued.*

acute, or apiculate, glabrous, in young plants trilobed. Australia, &c., 1822. A large, rambling, and climbing, leafy, greenhouse bush. SYN. *Polygonum adpressum* (under which name it is figured in B. M. 3145).

FIG. 604. MUEHLENBECKIA COMPLEXA.

M. complexa (embracing). *fl.* green, inconspicuous. August. *fr.* of a transparent wax-like substance, the tooth-like divisions glistening like miniature icicles, hanging in small clusters on lateral shoots from the more ripened stems. *l.* alternate, somewhat fiddle-shaped, distant. New Zealand, 1870. Hardy. See Fig. 604.

M. platyclada (flat-branched). *fl.* white, in lateral, few or many-flowered fascicles, sub-sessile. Blossoms almost throughout the year. Berries bright red, finally dark purple. *l.* membranous, hastate, oblong-lanceolate, or hastate-lanceolate. Branches leafless or sparsely foliate. Solomon Islands, 1865. A remarkable, glabrous, erect, greenhouse shrub. SYN. *Coccoloba platyclada* (under which name it is figured in B. M. 5382).

MUELLERA (named after Otto Frederick Müller, 1730-1784, a Danish botanist, and one of the editors of the "Flora Danica"). SYN. *Coublandia.* ORD. *Leguminosæ.* A genus comprising a couple of species of trees, the one inhabiting tropical South America, and the other (not much known) the hotter parts of Mexico. Flowers violet or whitish, in axillary or lateral racemes; calyx truncate, very shortly or obsoletely toothed; standard broad, ovate or sub-orbiculate, exauriculate. Leaves alternate, impari-pinnate; leaflets opposite, exstipellate. *M. moniliformis*, the species introduced to cultivation, is a tall, evergreen, woody, stove climber, differing from *Lonchocarpus* in the pod, which is thick, and of a dry, fleshy consistence. For culture, *see* **Lonchocarpus.**

M. moniliformis (necklace-podded). *fl.* whitish, disposed in simple, axillary racemes. *l.* impari-pinnate, with two pairs of ovate, acute, glabrous, petiolulate leaflets. Tropical America, 1782.

MUGWORT. A common name for **Artemisia vulgaris** (which *see*).

MUKIA (said to be the Indian name). ORD. *Cucurbitaceæ.* A small genus (one or two species) of stove, climbing, herbaceous plants, inhabiting Asia, Africa, and tropical Australia. *Mukia* is allied to *Bryonia*, but differs in the solitary or fasciculate female flowers, the campanulate calyx, the connective being produced at the apex, the spherical sessile berry, and the scrobiculate seeds. For culture, *see* **Momordica.**

M. scabrella (slightly scabrous). *fl.* yellow, small. *fr.* scarlet when ripe, ½in. in diameter. *l.* entire or lobed, with simple tendrils. India, &c. An elegant little annual.

MULBERRY (*Morus nigra*). The Mulberry-tree has been an object of cultivation in Asia, and in some parts of Europe, from a very remote and, possibly, unknown period, not so much on account of its fruit as for the use of the leaves, which are celebrated for providing silk-worms with food; silk, however, of superior quality is produced when the White Mulberry (*M. alba*) is the food-plant. The fruits are, however, very juicy when well ripened, and have a sub-acid flavour. They are occasionally used for dessert, and are also sometimes preserved, or made into a sort of syrup or wine. Many trees of large dimensions, and of a very great age, are to be found, as the Mulberry is extremely long-lived when planted in a deep, somewhat moist soil, and in a favoured situation. The first trees grown in England are stated to have been introduced in 1548, and planted in the gardens of Syon House. A great stimulus seems to have been given to Mulberry cultivation at the latter part of the sixteenth, and the beginning of the seventeenth, centuries, when, it is recorded, "Mulberry gardens were common in the neighbourhood of London; but, either from the climate, or the prejudices of the people, the growth of silk never prospered." In the same neighbourhood, at the present time, the tree succeeds and ripens its fruit well as a standard. Mulberries also thrive in all the more favourable parts of the country, but require a warm aspect and wall protection in the North of England, and in Scotland. It is questionable if the fruits are of sufficient merit, generally, to warrant such valuable space being devoted extensively to their cultivation. Where there is an orchard-house, a good-sized bush or standard tree may be grown in a tub or large pot, and excellent crops obtained, which will well repay for the protection afforded by their superior quality. The fruit does not keep long; consequently, the sooner it is used after becoming ripe, the better.

Propagation, &c. There are various methods by which the Mulberry may be propagated, namely, by seeds, by cuttings, and by layers; also by budding and grafting. Seeds should be washed from ripe fruits, thoroughly dried, and stored in bags, in a cool place, until spring; they may be sown under glass in March, or in the open ground in May. Except for obtaining stocks, this method is not much practised, as the plants are so long in reaching a size large enough for fruiting. Cuttings, 1ft. long, some two-year-old wood attached, should be taken from with well-ripened parts of the upper branches, either in early spring or in autumn, and be planted deeply, in a shady border, so that only about two eyes are left above ground. Even large branches themselves will root if inserted as deep as possible, and protected during winter. These latter should be kept steady and upright, by each being tied to a stake. Layering young branches is a common mode of propagation, also performed in autumn and spring, by any of the usual methods of layering that are available. Shield-budding is successfully practised on the Continent, in July and August, on stocks obtained either from seeds or cuttings. Grafting is also practicable, but is not much adopted, as the tree bleeds so much when cut. The Mulberry-tree succeeds in almost any good garden ground, but prefers a deep, rather light, and somewhat moist soil. In cold or wet situations, and in those which suffer much from drought, the fruits are liable to drop before getting fully ripened. When the trees are planted on lawns, or in orchards, and the ground beneath covered with turf, the fruits may be collected in a clean state, after being allowed to ripen so as to fall off; the latter are much sought after, and quickly devoured by birds. The Mulberry is amongst the latest of trees to burst into leaf in spring. The foliage is of a remarkable dark or bright green colour, in contrast with other trees in summer; and it is wholly destroyed by the first appearance of frost in autumn.

MULBERRY, INDIAN. *See* **Morinda.**

MULBERRY, PAPER. *See* **Broussonetia papyrifera.**

MULCHING. The process of applying various substances as a covering for soil above the roots of trees and plants, in order to prevent evaporation, and so preserve a uniform degree of heat and moisture. Mulching is also largely practised for other reasons, more particularly that of supplying a top-dressing of rich manure to established plants, so that its nutritive properties may be washed down by rain or artificial watering. All recently transplanted trees and shrubs, more especially fruit-trees, are greatly assisted by being provided with a Mulching of litter, half-rotted manure, leaves, or something of a similar description. This acts beneficially in retaining warmth and moisture, thus considerably neutralising the evil effects of drought, extreme cold or heat. Straw chaff, short litter, cocoa-nut fibre, and spent tan, are excellent non-conductors, where enriching properties are not required. For plants or trees needing help in summer, to perfect their flowers or fruits, a Mulching of fresh horse-dung, or good rotten manure, laid on the surface of the soil, and well watered occasionally, will often prove of immense permanent benefit.

MULGEDIUM. This genus is now included, by Bentham and Hooker, under **Lactuca** (which *see*).

MULLEIN. *See* **Verbascum.**

MULTIFARIOUS. Very numerous, or arranged in many rows.

MULTIFID. Cleft half-way into many parts.

MULTIPARTITE. Divided into many parts.

MUNDTIA named after Heinrich Mundt, a botanist of the seventeenth century). SYN. *Nylandtia*. ORD. *Polygaleæ*. A monotypic genus, the species being a small, much-branched, spinous, rigid, greenhouse shrub. It thrives in sandy peat. Propagated in May, by stiff young shoots, placed in sand, under a bell glass, in a cold frame.

M. spinosa (spiny). *fl.* white, with a red keel, small, sessile. January to May. *l.* scattered, spathulate, obtuse, rather mucronate. Branches smooth, spinescent at the apex, angular. *h.* 2ft. Cape of Good Hope, 1780.

MUNTINGIA (named after Abraham Munting, 1626-1683, at one time Professor of Botany in the University of Groeningen). ORD. *Tiliaceæ*. A monotypic genus, the species being a handsome, small, stove evergreen tree or shrub. A compost of sandy fibry loam and leaf mould, is suitable. Propagated by cuttings of half-ripened shoots, placed in sand, under a glass, in heat.

M. Calabura (Calabura). *fl.* white, 1in. in diameter, resembling those of the Bramble; pedicels in pairs, or sometimes in fours, axillary, one-flowered. June. *l.* sessile, oblique, unequal-sided at the base, lanceolate, villous beneath, 4in. to 5in. long. *h.* 15ft. to 25ft. Tropical America, &c., 1656. An infusion of the leaves is used as tea in Caracas. (B. M. 5982.)

MURALTIA (named after John Von Muralt, 1645-1733, a Swiss botanist). ORD. *Polygalæ*. A genus comprising about fifty species of greenhouse, densely-branched, small shrubs or under-shrubs, confined to South Africa. Flowers small, axillary, sub-sessile, solitary. Leaves few or fascicular, small, rigid, often acicular. *M. Heisteria*, the species best known to cultivation, is almost perpetually in flower under good treatment. It thrives best in a peaty soil, to which should be added plenty of sand. Propagated by cuttings of short young shoots, placed in sandy peat, under a hand glass. Similar culture will be suitable for the other species.

M. filiformis (thread-formed). *fl.* reddish, axillary, sessile, solitary, shorter than the leaves, rather distant, bracteate. Flowering during the greater part of the year. *l.* alternate, somewhat remote, awl-shaped. *h.* 12ft. 1800. (A. B. R. 424, under name of *Polygala micrantha*.)

M. Heisteria (Heister's).* *fl.* purple, small, axillary, sessile. January. *l.* triquetrous, stiff, spiny at the apex, in bundles. Branchlets puberulous. *h.* 2ft. to 3ft. 1787. (P. M. B. iv. 130.)

Muraltia—*continued.*

M. stipulacea (stipuled). *fl.* red, lateral, beardless. June. *l.* ternate, linear, acute. *h.* 3ft. 1801. (A. B. R. 363, under name of *Polygala stipulacea*.)

MURICATE. Covered with short, sharp points.

MURRAYA (named after John Andrew Murray, 1740-1791, a Swedish botanist, once Professor of Medicine and Botany in the University of Gottingen, and a pupil of Linnæus). SYN. *Chalcas*. ORD. *Rutaceæ*. A small genus (about four species) of unarmed stove trees or shrubs, inhabiting tropical Asia and tropical and Western sub-tropical Australia. Flowers rather large, solitary, axillary, or disposed in terminal cymules or in axillary cymes; calyx five-fid or five-partite; petals five, free, linear-oblong or ovate-lanceolate, imbricated. Berry small, one or two-seeded, oblong or ovoid. Leaves pinnate, leaflets petiolulate, cuneate at base or unequilateral, entire or obscurely crenulate. The species thrive in a compost of turfy loam and peat. Propagated by cuttings of ripened wood, which should be taken with leaves intact, and inserted in sand, under a bell glass, in moist bottom heat.

FIG 605. MURRAYA EXOTICA, showing Habit, and Flowering Branchlet (natural size).

M. exotica (foreign). *fl.* white, fragrant; peduncles many-flowered, corymbose. Aspect: *fr.* red, roundish, one-seeded. *l.* leaflets seven to nine, elevate, obtuse. *h.* 10ft. India, 1774. See Fig. 605. (B. R. 454.)

M. paniculata (paniculate). This is a mere form of the above, only differing in its fewer-flowered peduncles and more spherical habit.

MURUCUJA. Included under **Passiflora** (which *see*).

MUSA (*Maus* is the Arabic name of the genus, but Linnæus says he named it after Antonius Musa, the physician of Augustus). **Banana, or Plantain-tree.** ORD. *Scitaminæ*. Of this genus about eighteen plants have been described as species, but most of these are merely cultivated varieties. They are large-growing, stove, herbaceous plants, confined to the tropical regions of the globe. Flowers borne on a long nodding spike, clustered together in groups, protected by large, sometimes highly coloured bracts; calyx adherent, rupturing the apex bifid, or three or five toothed; corolla shorter than the calyx, or almost equal. Fruit fleshy. Leaves large, long. True stem very small; the sheaths of the leaves, however, are very long, and closely compacted, so as to form a kind of false stem. Musas are handsome foliage plants, available for culture in large pots or tubs when required to be movable, or they may be permanently planted in borders which afford sufficient heat and space for their development. Some of the hardier species under the first-named treatment, may be planted for sub-tropical gardening outside in summer. *M. Ensete* and *M. superba* are two of the best and hardiest for the purpose. A sheltered position is

Musa—*continued.*

necessary, the leaves being so soon torn by rough wind. *M. coccinea*, a dwarf-growing slender species, with a brightly-coloured inflorescence, may be grown well in

FIG. 606. MUSA CAVENDISHII.

10in. pots for winter decoration of tropical houses. Musas require a strong loamy soil, with plenty of manure added, and almost any amount of heat and moisture may be given in summer. In winter, a resting season should be allowed, water being almost, or, in some case, entirely, withheld. Propagation may be effected by seeds, sown in heat, during spring; and most of the species produce suckers, which also afford a ready method of increase. The plants are sometimes cultivated for their fruits, but not extensively, on account of the great space, and the amount of heat required. *M. Cavendishii* is the most compact-growing species for this purpose, and the one which is, perhaps, most certain to succeed. Strong suckers must be obtained to start with, and grown on in pots until established. They should then be planted in a prepared bed of very rich soil, and encouraged to grow vigorously by maintaining a high temperature and humid atmosphere. The time taken in growing plants to fruiting size varies considerably according to the treatment given in cultivation. A stem which produces a bunch of fruits, dies away very soon afterwards, but one or more strong suckers usually proceed from the base before this takes place.

M. africana (African). *l.* oblong, petiolate, in the young plant about 3ft. long, spreading, of a bright green colour, the petiole purplish, with a narrow purple margin. Pseudo-stems also flushed with a purplish tinge, which is continued along the back of the prominent midrib. Angola, 1871. A very fine dwarf-habited species, with a sturdy growth.

M. assamica (Assam). *l.* crowded, tufted, elliptic-lanceolate, stalked, about 1ft. in length, very unequal-sided at the base, acute at the apex, and running out into a slender, tendril-like point; green, with a narrow purple border. Pseudo-stems slender, about 1½ft. high, green. Assam, 1877. A dwarf-habited and elegant plant, and an excellent subject for table decoration.

Musa—*continued.*

M. Cavendishii (Cavendish's).* *l.* deep green, oblong, 2ft. to 3ft. long, 1ft. to 2ft. wide. *h.* 5ft. to 6ft. China, 1829. A well-known dwarf-growing species, requiring less heat than many others. See Fig. 606.

M. coccinea (scarlet).* *fl.*, inflorescence terminal, about 1ft. long, furnished with spathes of a brilliant scarlet, tipped with yellow. Flowering at various times throughout the season. *l.* entire, oblong, about 3ft. long and 6in. broad, bright dark green. Pseudo-stem about 8in. in circumference. *h.* 4ft. Cochin China, 1793. A very ornamental plant. (A. B. R. 47; B. M. 1559; L. B. C. 475.)

M. Ensete (Ensete).* *l.* oblong, nearly erect, about 16ft. long and 4ft. wide, of a fine bright green, with a broad, bright crimson, stout midrib. Pseudo-stem usually very thick, attaining sometimes a diameter of more than 3ft. at the base, and a height of from 13ft. to nearly 20ft. Abyssinia, 1853. The best-known species in this country, being the hardiest and best adapted for sub-tropical gardening. (B. M. 5223.)

M. paradisiaca (Paradise). Adam's Apple Plantain. *fl.*, spadix nodding. *fr.* ascending, long-sub-cylindrical, incurved, 1in. long. *l.* oblong. Stem green. *h.* 20ft. Tropics, 1690. (L. B. C. 684.)

FIG. 607. MUSA ROSACEA, showing (1) Habit, (2) detached Young Infructescence, and (3) Cluster of Fruits.

M. rosacea (rosy). Mauritius Plantain-tree. *fl.*, spadix nodding or erect; male flowers deciduous; spathe elliptic, very obtuse. March. *fr.* oblong. *l.* oblong, unequal or obliquely cordate at the base. Mascarene Islands, &c., cultivated 1805. See Fig. 607. (B. R. 706; L. B. C. 615.)

M. sanguinea (bloody). *fl.* yellow: bracts blood-red. *l.* linear-oblong, 2½ft. long. Stem 3ft. to 4ft. high. Assam, 1872. (B. M. 5975.)

M. sapientum (wise men's).* True Banana. *l.* deep green, oblong, from 8ft. to 10ft. long, and 1ft. wide. *h.* 20ft. Tropics, 1729. There are a great number of varieties of this species, with the fruits varying much in form, colour and flavour; sometimes the large clusters weigh as much as 70lb. or 80lb. The fruit, which is eaten either fresh, cooked, or dried, is of the highest importance to the inhabitants of the tropics of both the Old and New Worlds. "Though less nutritious than wheat or potatoes, yet the space occupied by their culture, and the care required, are so very much less, that Humboldt has calculated the produce of Bananas compared to that of wheat as 133 to 1, and to that of potatoes as 44 to 1" ("Treasury of Botany").

M. s. vittata (striped).* *l.* with a bright green ground, beautifully striped and blotched with white. Tropical Africa, 1862. An elegant variety. (B. M. 5402.)

M. sumatrana (Sumatran).* *l.* oblong-lanceolate, acuminate, glaucous-green, prettily marked with transverse, oblong, more or less confluent, chestnut spots. Sumatra, 1880. (I. H. 375.)

M. superba (superb).* *l.* oblong. Pseudo-stem swollen at the base. *h.* 14ft. India, &c., 1820. A very distinct and handsome

Musa—*continued.*

species, resembling *M. Ensete*, only more compact. See Fig. 608. (B. M. 3849.)

M. velutina (velvety). *fl.* yellow, on an erect purple spadix; lower ones densely velvety. *l.* about 3½ft. long, and nearly 1ft. broad, unequal at base, decurrent on the petiole, which is 1½ft. long. Stems stout, 1½in. in diameter, and about 4ft. high. Assam, 1875. (R. G. 823.)

M. zebrina (zebra).* *l.* oblong, dark green, with broad blotches of bronzy-red and purple, irregularly scattered. Pseudo-stem slender. *h.* 10ft. India, 1820. A very distinct and desirable dwarf-growing species.

MUSCADINE. *See* **Vitis vulpina.**

MUSCARI (from *Moschus*, Musk; alluding to the smell of the flowers). Grape Hyacinth. Including *Botryanthus.* ORD. *Liliaceæ.* A genus of very pretty hardy bulbous plants, natives of Europe, North Africa, and Western Asia. A great many plants have been described as species, but probably not more than forty are really distinct. Flowers suffused with blue, or greenish-blue or white, pendulous or nodding, racemose; perianth small, tubular, globose, often constricted at the mouth, with small reflexed lobes; scape simple, leafless. Leaves radical, few, linear, rather fleshy. Bulbs tunicated. The species of Muscari are well adapted for planting in the mixed or shrubbery border, and for naturalising in sunny spots amongst short grass, &c. They succeed in almost any soil and situation, but increase most rapidly where the former is rich, and of a free, open description. Propagation is readily effected by means of offsets, and by seeds, which latter ripen

Muscari—*continued.*

freely. For obtaining offsets, the old bulbs should be lifted early in the autumn of every second year. When none are required, they may be left alone for a much longer period, and allowed to increase. An annual top-dressing of fresh soil may be given with advantage in early spring, before the flowering season commences.

M. æstivale (summer). *fl.* yellow, with green ribs, the upper ones tinged with purple; scape 6in. to 8in. high, erect, pale green, mottled with purple below. June. *l.* bright green, long-linear, deeply concave. Native country unknown. 1877. (B. M. 6269.)

M. armeniacum (Armenian). *fl.* bright dark blue, with three small yellow dots near the mouth of the perianth, disposed in a dense spike about 2½in. long, very agreeably fragrant. May. *l.* concave, acuminated, 9in. long, ½in. broad. *h.* 6in. Armenia.

FIG. 608. FLOWERING PLANT AND DETACHED FLOWER OF MUSA SUPERBA.

M. botryoides (cluster-like).* *fl.* deep sky-blue, with six small white teeth or segments, disposed in a short, dense, almost globose cluster. Spring. *l.* linear, channelled, stiff, erect, slightly glaucous. *h.* 6in. to 12in. Europe, 1596. A well-known and pretty plant. (S. B. F. G. 15; B. M. 157, under name of *Hyacinthus botryoides.*) This species has two or three varieties, including *album*, with white, and *pallidum*, with pale blue flowers.

M. commutatum (changeable). *fl.* bluish at first, changing to reddish-purple, disposed in very short racemes; teeth of perianth inflexed. Spring. *l.* linear, flaccid, longer than the flower-stem. *h.* 6in. to 10in. Sicily, 1836. (S. B. F. G. ser. ii. 369.)

M. comosum (tufted). *fl.*, sterile ones blue, twenty to thirty, corymbose; fertile perianth obovoid-urceolate, amethyst-lineolate; racemes loose, forty to one-hundred flowered; scape 1ft. or more long, dusky-spotted. April. *l.* three or four, fleshy-herbaceous, pale green, linear-lorate, 1ft. to 1½ft. long, ½in. to 1in. broad. South Europe, 1596. See Fig. 609. (B. M. 133, under name of *Hyacinthus comosus.*)

Muscari—*continued.*

M. c. monstrosum (monstrous-tufted).* Feather Hyacinth. *fl.* bluish-violet, all barren, and the inflorescence transformed into a dense tuft of slender ramifications. Early summer. *l.* linear, toothed at the edges, longer than the flower-stem. *h.* 1ft. to 1½ft. South Europe, 1596. A very remarkable and distinct form, far too rarely seen in our gardens.

FIG. 609. RACEME OF MUSCARI COMOSUM.

M. concinnum (neat). *fl.* bright blue, tipped with white, strongly scented; raceme dense, over 1in. long; scape 3in. to 4in. long. Spring. *l.* linear-sub-terete, 6in. long, about ⅛in. broad. Native country uncertain.

M. conicum (conical). *fl.*, fertile ones bright violet-blue; sterile ones few, light blue; raceme dense, oblong-conical, 1in. long; scape slender, 6in. long. March. *l.* flaccid, six to a bulb, nearly 1ft. long. Campagna.

M. dilutum (diluted). *fl.*, perfect ones deep violet; sterile ones pale violet, crowded, sessile; raceme dense, 1½in. long; scape 4in. to 6in. long. Spring. *l.* several, linear, flaccid, 1ft. long, under ¼in. broad, red-purple at base. Native country unknown.

M. Elwesii (Elwes').* *fl.*, sterile ones bright blue, few; raceme dense, ½in. to ¾in. long; scape slender, 3in. to 4in. long, reddish at base. April. *l.* several, flaccid, terete, 6in. long, half a line in diameter. Caria.

M. grandifolium (large-leaved). *fl.* livid blue; racemes densely fifteen to twenty-flowered; scape 5in. to 6in. long. *l.* five or six, fleshy-herbaceous, glaucescent, 1½ft. to 1½ft. long, ½in. broad, linear-lorate, flaccid. 1869. (Ref. B. 173.)

M. Heldreichii (Heldreich's).* *fl.* blue, very similar to those of *M. botryoides*, but nearly double the size, and arranged in a longer raceme. Spring. *l.* linear, flat. *h.* 8in. Greece, 1869. (Ref. B. 172.)

M. luteum (yellow). *fl.* large, very dull yellow at first, but changing to a clear, waxy, sulphur-colour, delightfully fragrant. Spring. *l.* channelled, 8in. to 10in. long. *h.* 6in. South Europe.

M. macrocarpum (large-fruited). A synonym of *M. moschatum flavum*.

M. micranthum (small-flowered). *fl.* fragrant; fertile ones bright violet; sterile ones pale blue, minute; racemes dense; scape slender, 4in. to 5in. long. April. *l.* 5in. to 6in. long, ⅛in. to ⅛in. broad, flaccid, linear, sub-terete.

M. moschatum (musky).* Musk Hyacinth. *fl.* purplish at first, changing to a greenish-yellow tinged with violet, very fragrant, arranged in a dense, nearly globose cluster, about 2½in. long. Spring. *l.* alternate, linear, concave, about as long as the flower-stem. *h.* 8in. to 10in. Asia Minor, 1596. A pretty and exceedingly fragrant, but very inconspicuous species. (B. M. 734.)

Muscari—*continued.*

M. m. flavum (yellow). *fl.*, perianth yellowish; teeth purple; racemes loose, 2in. to 3in. long, 1in. or more thick. (B. M. 1565; S. B. F. G. 210, under name of *M. macrocarpum*.)

M. neglectum (neglected).* *fl.* deep blue, sweet-scented; raceme dense, thirty to forty-flowered, 1½in. to 2in. long, nearly 1in. wide; scape 6in. to 9in. long. *l.* linear, filiform, deeply channelled, fleshy. France, Italy, &c. (G. Aug. 16, 1884.)

M. pallens (pale). *fl.* white, abortive ones three or four, subsessile; raceme dense, twelve to twenty-flowered; scape 3in. to 5in. long. May. *l.* two, filiform, semi-terete, 6in. to 8in. long, one line broad, greenish. Crimea, 1822. (S. B. F. G. 259.)

M. paradoxum (paradox).* *fl.* blue-black, greenish inside, faintly scented; raceme dense, conical, 1½in. long; rachis lurid purple; scape green, 5in. to 6in. long. April. *l.* three, erect, terete, 8in. to 9in. long, ½in. to ¾in. broad. Bulb large. Caucasus. A well-marked plant.

M. racemosum (racemose).* *fl.* dark blue, small, ultimately changing to a reddish-purple, and sometimes tipped with white, smelling strongly of Plums; racemes terminal, dense. Spring. *l.* linear, stiff, fleshy, 6in. to 12in. long. *h.* 4in. to 8in. Europe (Britain), Asia. (Sy. En. B. 1529; B. M. 122, under name of *Hyacinthus racemosus*.)

M. Szovitsianum (Szovits').* *fl.* faintly scented; fertile ones bright blue; sterile ones light blue; raceme dense, 1½in. long; scape 4in. to 5in. long. March and April. *l.* flaccid, linear-sub-terete, 5in. to 6in. long, ⅛in. to ⅛in. broad. Bulb rather large. Persia, Caucasus, &c.

MUSEÆ. A tribe of *Scitamineæ*.

MUSHROOMS. The popular name given to a group of Fungi, very numerous in species, but with a strong family likeness, which renders them easily recognisable, as will be seen from the subjoined figures (Figs. 610 and 611). In a limited sense, the name is often used to denote certain edible Fungi; but, in a wider sense, it includes many useless and poisonous kinds, such as Toadstools, the Fly Agaric, and numerous others belonging to the genus *Agaricus*, as well as to certain allied genera, viz., *Boletus*, *Cortinarius*, *Hydnum*, *Lactarius*, &c.; and it is even used occasionally, but incorrectly, to denote all Fungi. Excluding this last sense, the Mushrooms, in their commonly-known condition, are only the spore-bearing parts of the plants, and arise from a dense network of filaments (mycelium) buried in soil containing decaying matter, or in the wood of dying or dead trees. These spore-bearers generally resemble a cap (pileus), supported on a stalk, which is fixed to the lower surface of the cap in the middle, or, less frequently, to one side of it. The cap may vary from ½in. to about 1ft. across, and the stalk also varies much in length and in thickness. On the lower surface of the cap is spread the hymenium, or surface on which the spores are formed. These are fixed to short, slender stalks, of which four stand on the free end of each of certain large cells (basidia), which are scattered over the hymenium. The latter varies much in the mode of attachment to the cap, and in the degree and modes of folding that it undergoes. The genera and species nearly related to the true Mushrooms have it easily separable from the tissue of the cap; but *Polyporus*, and certain allied forms have it closely grown to the latter. The surface over which the hymenium is spread, is very much increased, in most of the genera, by being folded in various ways.

In *Agaricus*, the genus to which the great majority of Mushrooms belong, the lower surface of the cap bears numerous thin plates (gills), hanging downwards, and radiating from the stalk to the circumference; and on the sides of these the spores are formed. The gills may be continued unbroken into the stem, or may be separated from it by a narrow space. This difference in the gills, the varied colours of the spores, and the presence or absence of the veil—a membrane passing, in the young Mushroom, from the edge of the cap to a ring round the stalk—are all important characters in determining the genus and species of Mushroom under examination. In *Hydnum*, the hymenium is scattered

Mushrooms—*continued.*

over fleshy, tapering outgrowths, or teeth, on the lower surface of the cap; in *Boletus* and *Polyporus*, the surface is formed by reticulately-joined ridges, that leave

FIG. 610. COMMON MUSHROOM (AGARICUS CAMPESTRIS).

tubes, or pores, between them; in *Craterellus*, it is smooth, or merely wrinkled. Mushrooms vary exceedingly in colour, the upper surface of the cap usually showing more decided tints than the stalk. Many are white; others yellow; others red in various tints; others show shades of grey or brown, at times almost passing into black. A smaller proportion are some shade of blue, or of metallic green; but they do not show a pure leaf-green, dependent on the presence of chlorophyll, since they never contain this substance. The surface of the cap is usually smooth; it may be sticky, hairy, warty, &c. Some species change colour, at once or gradually, if any part is broken. This is peculiarly noticeable in some kinds of *Boletus*, in which the bruised surfaces become an intense blue. The change to blue is to be regarded as a sign that the Mushrooms which show it are poisonous or suspicious in their properties. The smell of Mushrooms is slightly peculiar, and is usually not difficult to recognise, there being in it something that reminds one of a closed, mouldy vault or cellar. In decay, most of them emit a strong nitrous smell, some have a most disagreeably fœtid stench, but others are rather pleasantly scented, like newly dried hay. A curious property of some Fungi is the luminosity they display. In some kinds, the light is so strong that, in dark places, the plants can be seen from a considerable distance. This phenomenon is manifested by species in various groups of Fungi; but the most striking examples are met with in the genus *Agaricus*, several members of which have been observed to be luminous, apparently in the healthy state. In some, the cap and stalk emit light; but more frequently the mycelium in decaying wood is the luminous part. Another characteristic of some Mushrooms—*e.g.*, the genus *Lactarius* and several species of *Agaricus*—is the appearance, on broken or cut surfaces, of a milky fluid—the latex—which pours out from long tubular cells in the tissues of the plant. This

Mushrooms—*continued.*

fluid may be white, yellow, or orange; and, at times, changes colour after being exposed to the air for a short time. In some cases, the latex has a pleasant taste, while, in others, it is very acrid. Mushrooms, like Fungi in general, are propagated by means of spores, which, as already mentioned, are borne on large cells (basidia), produced on the hymenium. These spores can be obtained by laying the Mushrooms, gills downwards, on paper, which should be of a tint to contrast with them in colour. They will be found to map out on the paper the arrangements of gills or pores, and, in this way, their colour in mass also can be easily detected. The colour of the spores is largely employed in breaking up the very large genus *Agaricus* into sub-genera of more convenient size.

Uses. Mushrooms and their allies include almost all the Fungi that can be regarded as of direct use to man as food-plants. A considerable number have been, or are, used in diet, either because of the amount of nitrogenous matter in them, or as imparting a pleasant flavour to the articles with which they are served at table. But, while it is comparatively easy to recognise certain of the well-known edible Mushrooms, great care is required to prevent serious results when poisonous species are gathered by mistake, and eaten with the useful ones. Such a mistake is not infrequent, since a very great resemblance exists between certain poisonous and edible kinds. The Mushroom most generally esteemed in Britain is the Common Mushroom (*Agaricus campestris*, see Fig. 610). It is so well known as scarcely to call for a detailed description of its appearance. It is largely cultivated, but it is also frequently abundant in pastures, especially in natural grass land or meadows. At first, the gills are pale pink, or salmon-tinted, but they deepen into a peculiar purplish-brown. The upper surface of the cap varies somewhat in colour and smoothness, and there is a permanent ring of tissue around the stem, a

FIG. 611. ST. GEORGE'S MUSHROOM (AGARICUS GAMBOSUS).

little way below the cap. This Mushroom does not enjoy the same high reputation on the Continent of Europe that it possesses among ourselves; and, in Italy, it is said to

Mushrooms—*continued.*

be regarded by the labouring classes as even poisonous, or, at least, suspicious.

A nearly allied kind, the Meadow or Horse Mushroom (*A. arvensis*), is considerably larger than the last, and grows in similar localities; but its cap is pure white on the top while young, and it has paler gills than *A. campestris*. It is often gathered in large quantities for sale, but is somewhat less delicate than the Common Mushroom in its flavour. These are most abundant in autumn, but the St. George's Mushroom (*A. gambosus*, see Fig. 611), a large species, appears in spring. For this reason, and because of its flavour, it is much esteemed, and fetches a high price. The cap is nearly white, the gills are pale yellowish, and there is no ring on the stalk. It can be dried so as to retain its characteristic flavour. It smells strongly of new meal. Numerous other species of the genus *Agaricus* are recognised in Britain as edible. Several of these are more abundant in woods than in open places, despite the general rule that Fungi from such localities are more open to suspicion. From among these useful Agarics we may enumerate the following, which, for the most part, are less generally known than are the preceding; and which are somewhat dangerous to use, from their resemblance to certain kinds which are often to be found in similar localities: *A. fragrans* and *A. odorus*, both with a scent like aniseed; *A. maximus*, white, may reach 14in. in breadth of cap; *A. ostreatus* and *A. ulmarius*, found on Elm trunks, both with stalk attached to one side of the cap; and *A. prunulus*, a white Mushroom, with a smell like meal, found growing in woods. Berkeley, in his "Cryptogamic Botany," p. 367, says that at least a tenth of the species of *Agaricus* are esculent. Other Mushrooms belonging to genera nearly allied to *Agaricus* are scarcely, if at all, inferior to its species in their value as food-plants for man; nor would the generic differences between them and *Agaricus* strike anyone not a botanist as of much importance. The more valuable of these edible forms are *Marasmius oreades* (*see* **Marasmius**) and *Coprinus comatus*. The latter is esteemed while the gills are still whitish or reddish in colour, but it soon becomes soft, and deliquesces into an inky fluid; it is common in pastures and other open places. Several species of *Cortinarius* (a genus with rust-coloured spores and a web-like veil) are also edible. All of them inhabit woods. Among them may be noted *C. violaceus* and *C. cinnamomeus*, characterised by their colours, to which they owe their specific names. In the genus *Lactarius*, notable because of the milky juice that its species contain, several are dangerous and acrid; but others are esculent, their juice being mild and pleasant in flavour. The quality of *L. deliciosus* is sufficiently indicated by its name. This Mushroom is an exception to the rule that change of colour in broken parts is to be regarded as a sign of poisonous properties, since the milk in it, when fresh, is saffron-coloured, but, when exposed to the air, becomes dull green.

The genus *Russula* also includes both poisonous and edible species, but need not be dwelt on here, as the latter are not largely used.

Cantharellus cibarius, or the Chantarelle, is one of the best of edible Mushrooms. *See* **Chantarelle.** Very similar in appearance to the gill-bearing Fungi are many of those in which the gills are replaced by teeth, as in *Hydnum* (*see* **Hydnum**), or are united, so as to leave between them tubes or pores, as in *Boletus*, *Fistulina*, and *Polyporus*, and these are usually included among Mushrooms. *Boletus* includes numerous kinds, much like Agarics, but the lower surface of the cap shows very numerous pores. *B. edulis* (see Fig. 612) is sold in many parts of the Continent of Europe, cut into thin slices, or hung on strings and dried. It is little esteemed in England. *B. æstivalis*, which appears in early

Mushrooms—*continued.*

summer, is said to be of excellent flavour. Various other species of *Boletus* have been recommended as of fair quality, such as *B. aureus*, *B. aurantiacus*, &c.; while others, on the contrary, are dangerous.

Polyporus is a very large genus, the species almost all growing from dying or dead wood, and being attached to the stalk by one side. The spore-bearing surface is usually below. The species vary much in texture, between fleshy and woody. Several may be said to be edible, but cannot be highly recommended.

Fistulina hepatica, or the Beef-steak Fungus, like the last, grows on trees, usually Oak, and is much like *Polyporus* in structure, but is juicy. The popular name is derived from the great resemblance to a piece of beef-steak. Its weight may exceed 20lb. It is used sliced and eaten with salad, or like true Mushrooms, and is much esteemed as an article of diet. Catsup, or Ketchup, made from the juice of many kinds, is also a valuable product of the group.

FIG. 612. BOLETUS EDULIS.

INJURIOUS PROPERTIES OF MUSHROOMS. Some of the evils attending the use of these plants must be mentioned here. Among the more serious are the poisonous effects produced when many of them are used as food, these effects varying, according to the nature of the Fungus, from mere nausea to very serious symptoms, or even death. Many of the poisonous species are so similar to edible ones, that the only safe rule to follow is to make oneself thoroughly familiar with the latter, or, at least, with a few of them; and to use these alone rather than to risk the consequences of using poisonous kinds by mistake. Rules have frequently been given whereby poisonous and edible Mushrooms respectively may be recognised, such as that those should be avoided, or, at least, used with great caution, that grow on wood, or have a strong, disagreeable smell, or acrid taste, or turn blue when broken, or are bright red in colour, or have pink spores; but all such rules err by admitting hurtful, or excluding useful, kinds, and only familiarity with the individual species can be safely relied on as a guide as to what to use. But even edible Mushrooms may become injurious if kept too long before being eaten; hence, they should be used only when fresh, except in the case of the few, like *Marasmius oreades*, that can be dried and preserved for future use. Any suspicious kinds should be cooked for a long time with abundance of salt and vinegar, as the poisonous properties are fre-

Mushrooms—*continued.*

quently removed by this treatment. Among the most poisonous of the commoner Mushrooms is *Agaricus (Amanita) muscarius*, or the Fly Agaric, a large Mushroom, with a red cap, studded over with pale warts

FIG. 613. FLY AGARIC (AGARICUS MUSCARIUS).

(see Fig. 613), common in woods in Britain. This plant, if eaten, even in small amounts, causes headache, nausea, and delirium, and often convulsions, followed by stupor; and the urine of those who have eaten it, when swallowed, produces the same effects. It is occasionally used as a fly poison, whence its name. *Russula emetica*, with smooth red cap and white gills, also found in woods, is very poisonous, giving rise to vomiting and purging. Many others, more or less virulent, might be dwelt upon, did space allow. But, besides directly bad effects, many Mushrooms are scarcely less hurtful indirectly, by the evil they do to trees and other plants, unless, indeed, we suppose the fungi to follow, not to cause, disease. From this point of view, *Agaricus melleus* is probably the most hurtful of the true, or gill-bearing, Mushrooms. It grows usually in dead or dying wood, but it also attacks cut or bruised surfaces, and from these its mycelium extends to the healthy wood, and soon causes the latter to decay. Very frequently, the

Mushrooms—*continued.*

mycelium forms black root-like bodies, running between the wood and the bark of the tree, emitting short branches at right angles to the larger ones. It is peculiarly injurious to conifers, and seems to be almost cosmopolitan in temperate zones. Its evil properties may be regarded as slightly compensated by its being edible, though not highly esteemed because of its acrid, disagreeable taste. The stalk is yellowish, with a blackish tinge at the base, 3in. or 4in. long, at last becoming hollow, and near the top bearing a complete annulus. The cap is yellow-brown (or may show a greenish tinge), with the centre darker, and bears scattered brown scales. The gills are white or yellowish, and are broad but unequal. The cap has a peculiar earthy aspect. The pore-bearing Fungi are yet more hurtful than Agarics, and several species of *Polyporus* may be enumerated that are markedly injurious to trees. Observations upon their powers of doing harm have been made far more completely in Germany than in our native forests. Space will permit here of little more than an enumeration of some of the more generally distributed of the hurtful kinds, *e.g.*, *P. sulphureus*, on Oak, Willow, Larch, &c.; *P. dryadeus*, on Oak; *P. betulinus*, on Birch; *P. igniarius*, on Poplars, Willows, Ash, Cherry, &c.; and *P. vaporarius*, on conifers. The nearly allied *Trametes Pini* and *T. radiciperda* are very fatal at times to Pines on the Continent; and *Fistulina hepatica* causes the decay of Oak. Wood prepared or made use of for building houses or ships is also liable to injury unless thoroughly seasoned and kept in a dry place; and Dry-rot is but too familiar to many a householder, because of the rapid decay induced by the mycelium of Fungi, by which the wood is brought into a powdery, rotten state. The species that generally bring about this condition are **Merulius lacrymans** (which *see*), *Polyporus hybridus*, and *P. vaporarius*; but others also are known to be destructive.

Remedies. Upon the nature of the injuries done by Fungi, the remedies must, of course, depend. To avoid evil effects from the use of Mushrooms as food, great care must be exercised to insure that only edible kinds shall be gathered and made use of. Long exposure to heat in cooking, combined with the free use of salt and of vinegar, has been found to remove the poisonous properties of many species, but not of all. Should evil results follow the use of Mushrooms in food, the readiest means for the removal of the food by emetics and purgatives should be resorted to, and a doctor should be summoned without delay. It is hardly possible to prevent the death of trees attacked by such Fungi as *Agaricus melleus* or *Polyporus squamosus*, since the wood is full of their mycelium. Unless the trees are of very peculiar value, it is better to destroy them at once, in order to prevent the Fungus spreading to other trees. Prevention is far better than cure, and more regard must be paid to the preservation of those still sound than to keeping the diseased one. Young trees should never be planted in soil in which there are decaying pieces of wood. For the treatment of Dry-rot, *see* **Merulius lacrymans.**

A few words may be added upon the geographical distribution of Mushrooms. Many of them are known to be almost cosmopolitan, or to be distributed in countries very wide apart; while others are, as yet, known to occur only in very limited areas, probably because of the small number of workers in this group of plants leaving our information regarding them very incomplete. The genus *Agaricus* is more abundant, and its species are more fleshy, in temperate than in tropical latitudes. On the contrary, *Polypori* are more numerous and striking in tropical regions. In temperate climates, Mushrooms are most numerous in autumn; but, in tropical countries, they appear all the

Mushrooms—*continued.*

year round. In respect to habitat, Mushrooms may be met with in all situations where decaying or dying plants occur, or where the soil is full of organic matter. Hence, they are most abundant in forests, on the soil, and on dead or dying trees; and some species prefer woods composed of certain kinds of trees—thus, forests of Firs and other conifers are particularly rich in Mushrooms. *Agaricus* affords examples of preferences of all kinds, some even growing on dead plants of other species of this genus, others in open places, but most in woods. The sub-genera usually show a preference for some one kind of habitat, *e.g.*, *Amanita* and *Collybia* prefer woods; *Lepiota* and *Psalliota*, open places; *Omphalia*, swamps; and so forth. *Cantharellus* prefers grassy spots in woods; *Coprinus*, the neighbourhood of mankind; *Hygrophorus*, open places, such as meadows and moorlands, even high on the sides of mountains; *Hydnum*, the shade of woods; *Russula*, soil in open places in woods. *Polypori* are almost confined to woods, or to dead logs.

Mushrooms preserve badly as fossils; hence, comparatively little is known of them in this state, though a few, *e.g.*, *Polyporus lucidus*, have been found semi-fossilised in the later formations.

CULTIVATION. The cultivation of the common Mushroom (*Agaricus campestris*) is invariably work of great importance in gardens, a supply being generally expected from those wherein the means of cultivation are at command. Conditions requisite for securing good crops seem, in many instances, to be of an exact description, while, in others, excellent results are attained when only ordinary attention is bestowed in preparation. This may partly be attributable to the seasons, natural temperatures, and other matters being favourable or otherwise to Fungus growth. Gardeners experienced in Mushroom culture, know with tolerable certainty, how a bed is likely to succeed from the time it is made up and spawned; but there are many cultivators, noted, maybe, for their success in other departments, who, from one reason or another, frequently fail to secure satisfactory results from their efforts devoted to Mushroom culture. There are various causes to which failure may be attributed, if any of the numerous details in cultivation are improperly executed. Attention from the first in the preparation of manure, is one of the most essential points; then, its condition when made into a bed, respecting the temperature likely to be reached by fermentation; afterwards, and last, but not least—to omit a special reference to minor matters—the quality of the spawn. Mushrooms are far more extensively grown, for various reasons, in winter and spring, than they are in summer time, the produce being then in great demand, and no supply obtainable from the open air, as in the latter part of summer and in autumn. A cool temperature, also, is more suitable to their growth, in the later stages, at least, and this is only with difficulty obtained in summer, except by those fortunate enough to possess a house or cellar below the ground level for devoting to Mushroom culture. The spawn requires a somewhat high temperature at first to cause its diffusion to all parts of the bed, and then a much cooler one throughout the later stages of development into the Mushroom as it is used. This is well shown by the appearance of the crop naturally in greater abundance outside when the temperature of both the earth and air are on the decline, and the ground is well moistened by early autumn rains.

Preparation of Manure. Manure from stables in which carriage horses are kept, is usually procurable for Mushroom culture, and, as a rule, none could be better suited for the purpose. It should be collected each morning, if possible, and laid separate from the litter in a covered shed, with an open front. Here it must be

Mushrooms—*continued.*

frequently turned, to prevent overheating, and to allow of the escape of rank steam. When enough is accumulated to make a bed of the desired size, it should be kept separate from any that is freshly obtained, the latter being put into another heap, and, in turn, similarly treated. Each or every alternate morning, the heap first referred to must be turned and well shaken apart, until rank steam is no longer present, and the manure is just sufficiently moist to hold together when squeezed. The time thus taken in preparation varies considerably, according to the prevalence of a dry or moisture-laden atmosphere. Some cultivators of Mushrooms prefer a portion of litter mixed with the manure, while others do not. The chief difference is the effect it has when the beds are being made, in preventing the mass from being rammed too firmly. The degree of firmness often affects the period over which the crop is produced, by shortening or lengthening it in proportion. This will be further referred to; and as good results have been obtained both with and without litter intermixed, the matter is not one of material importance.

Formation of Beds, Spawning, &c. The manure, having been thoroughly prepared, as above described, should be made up at once into a bed, a suitable depth for this being 9in. in front and about 12in. at the back, if against a wall. The size in other directions must be regulated by the amount of manure available and other circumstances. When a supply of Mushrooms is required in the shortest possible time, the manure should be merely well trodden, to render it firm, but otherwise it should be rammed hard throughout with a brick or hand-rammer. It is not advisable to introduce the spawn at once, as its vitality may be destroyed if the bed should become over-heated. The highest temperature here recommended at which spawning may be practised with safety, is 90deg., and it should be known for certain that the heat is, at the time, gradually receding below that point. Small pieces of spawn should be inserted in holes made with a trowel, about 4in. apart, the manure so removed being used for covering it over. In about a week afterwards, or sometimes earlier, 1in. to 2in. of moist, rather heavy loam, free, if possible, from sand, which is very injurious, should be laid all over the surface, and beaten hard with the back of a spade. The tiny Mushrooms seldom appear in less than four or five weeks from spawning, and the time during which the beds remain productive afterwards varies very considerably. Mushrooms are often more in demand for various dishes when about half than when fully developed. In this stage,

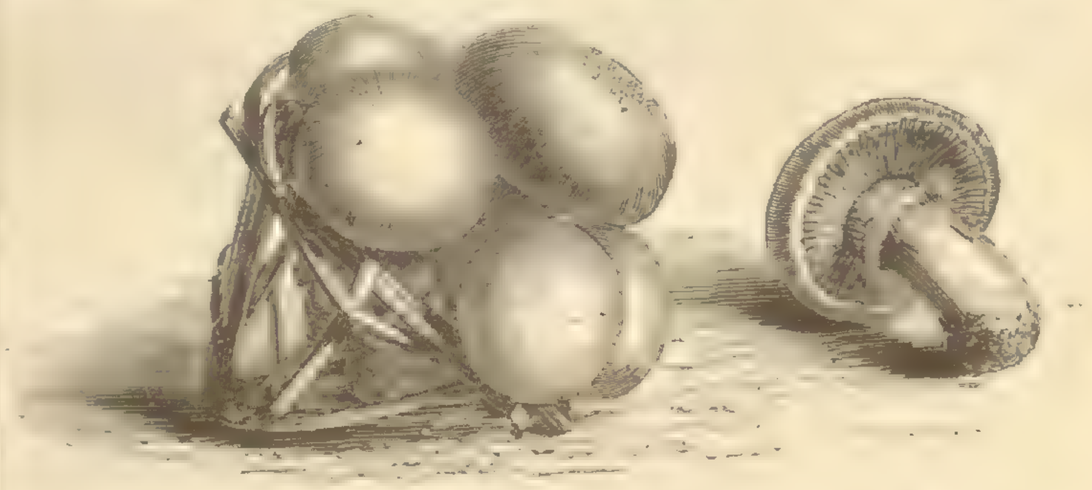

FIG. 614. MUSHROOMS (AGARICUS CAMPESTRIS), in the "Button" stage of development, and one older.

represented in Fig. 614, they are called "buttons," the single specimen shown being, however, that of an older one. No more should be cut when at this size than is really necessary, as it is obvious that the crop would be enlarged considerably by allowing a few days' more growth. A successional bed should be ready for spawning by the time the previous one begins bearing. Opinions differ respecting the watering of Mushroom beds. It is tolerably certain that watering frequently proves very injurious,

Mushrooms—*continued.*

and should be avoided as much as possible; yet it is difficult to keep the surface sufficiently moist when fire-heat becomes a necessity. Sometimes, when beds have become very dry, a good watering has caused a heavy crop to spring up; consequently, it is not always an injurious practice. The walls of the Mushroom house should be frequently syringed, and the floor always kept moist, especially when the use of fire-heat is necessary.

Outside Culture. Growers of Mushrooms on a large scale for market, pursue a different system altogether from that just described, by forming their beds in ridges outside. These ridges are made on a hard piece of ground, and are about 3ft. wide at the base, the two sides sloping somewhat steeply to the top (see Fig. 615). The manure is collected from stables, and turned a few times, but it does not receive so much preparation as is recommended above for indoor beds. It is well trodden, and the sides are beaten hard into shape. After spawning, the whole surface is covered with about 2in. of adhesive loam, which is usually watered, and then beaten with the back of a spade. A covering of litter or long straw, varying in thickness according to the temperature of the bed, is kept over the whole, as shown in the illustration, to ward off storms, and preserve, as near as possible, a uniform temperature underneath. It is obvious that this system involves a considerable amount of labour not required with beds inside, in covering and uncovering for every purpose, yet it is practised most successfully and very extensively by growers for market. Another plan, which may be useful for growing Mushrooms in outside beds, and affording them protection

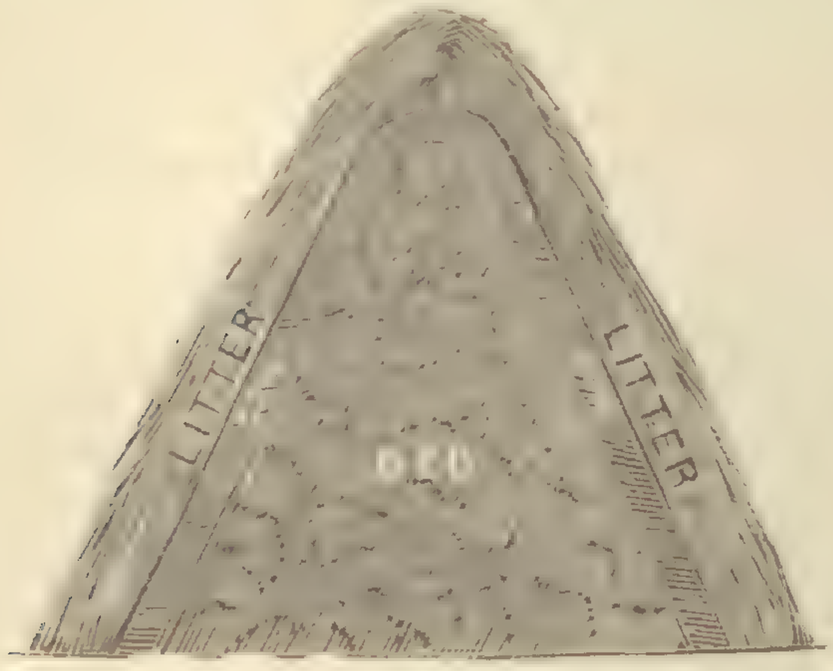

FIG. 615. RIDGE MUSHROOM BED.

FIG. 616. PLAN FOR PROTECTING OUTSIDE MUSHROOM BEDS.

in winter, is shown in Fig. 616. Any sort of framework might be roughly constructed above the bed on

FIG. 617. STRAW SCREEN FOR COVERING MUSHROOM BEDS

which to place mats or other coverings, and a cord run over to fasten them on. Straw screens (see Fig. 617),

Mushrooms—*continued.*

or thatched hurdles, are excellent movable coverings, and, being non-conducting, they are well suited for preserving an equable temperature, where the admission of light is not necessary. A crop of Mushrooms is frequently found growing naturally outside in places where they are least expected, and such produce is considered superior to that obtained under artificial cultivation. The insertion of some spawn in an old melon bed, in the ordinary turf of a lawn, or in a small quantity of manure in any old cool frame, are also methods, at times, successfully practised with but little trouble in the summer and autumn.

Preparation of Spawn. What would be more correctly termed mycelium, is usually, in the case of the common Mushroom, called spawn. It is a dense, white, fibrous substance, found in quantity amongst old hotbeds, and in places where cattle are kept, these situations being most suitable for encouraging its growth. A dormant vitality is retained by this spawn for a very long time, if kept quite dry; consequently, the soil or manure containing it may be collected in a loose state, and scattered on beds artificially prepared, at any time. A plan which is, however, preferable to this, and the one most generally adopted, is the preparation of spawn in what are called bricks, from their resemblance in shape to flat bricks. These may be purchased from nurserymen, ready for use, at any season, about sixteen being considered equal to a bushel. Extensive cultivators sometimes prepare their own brick spawn; but only a very few, compared with the number who purchase it. One of the modes of preparation is briefly as follows: Fresh horse-droppings are collected and mixed with cow-dung, some using an equal proportion of each ingredient, and some a less quantity of the former, and a little adhesive loam is added to hold the other constituents together. The whole is mixed with liquid stable manure, until as soft as mortar, when it is spread on the floor of an open shed, until sufficiently dried to form into bricks of the shape and size desired. These should be set on edge, turned frequently, and allowed to get about half-dry. Then a hole, about 1in. square, should be made in one side of the brick, near the centre, and filled with good spawn, inclosing it with a little of a similar substance to that of which the bricks were made. Prepare a bed of fresh horse-dung, about 9in. thick, on a dry bottom; build the bricks in a pile above it, allowing a space between each two, and cover with litter, so as to retain a temperature underneath of, as near as possible, 60deg. Under such conditions, the spawn will spread itself throughout the whole of each brick, and the latter must be frequently examined and removed when they are permeated with a white cloudy substance, not so far advanced as to show minute threads. Good bricks of spawn should be in this condition when purchased; otherwise, any part which is too far advanced, or, on the other hand, not properly permeated with mycelium, will be useless. When removed from the hotbed, the drying process should be completed thoroughly, and the bricks stored in a cool, dry place, to arrest any further *vegetation*, until required for use. Other systems of preparing brick spawn are practised, differing mainly in details concerning the proportion of the different substances which it is advisable to use in the preparation and formation of the bricks.

Mushroom Houses. A Mushroom house may either be a span-roofed structure, or one with a lean-to roof against the back of a high wall. It should be situated as much as possible in the shade, in order that the internal temperatures may not be subjected to so much fluctuation, by reason of the sun shining on the roof. Hot-water pipes should be provided for maintaining the proper temperature in winter; but fire-heat is best done without as much as possible. The interior space may be fitted up for beds according to its size and shape, by having

Mushrooms—*continued.*

them on one or both sides against the walls, and a path down the centre; or, the beds placed above each other in the middle, and a path allowed all round, a plan sometimes adopted in span-roofed houses (see Fig. 618). In Fig. 619 a section of lean-to Mushroom house is represented, where

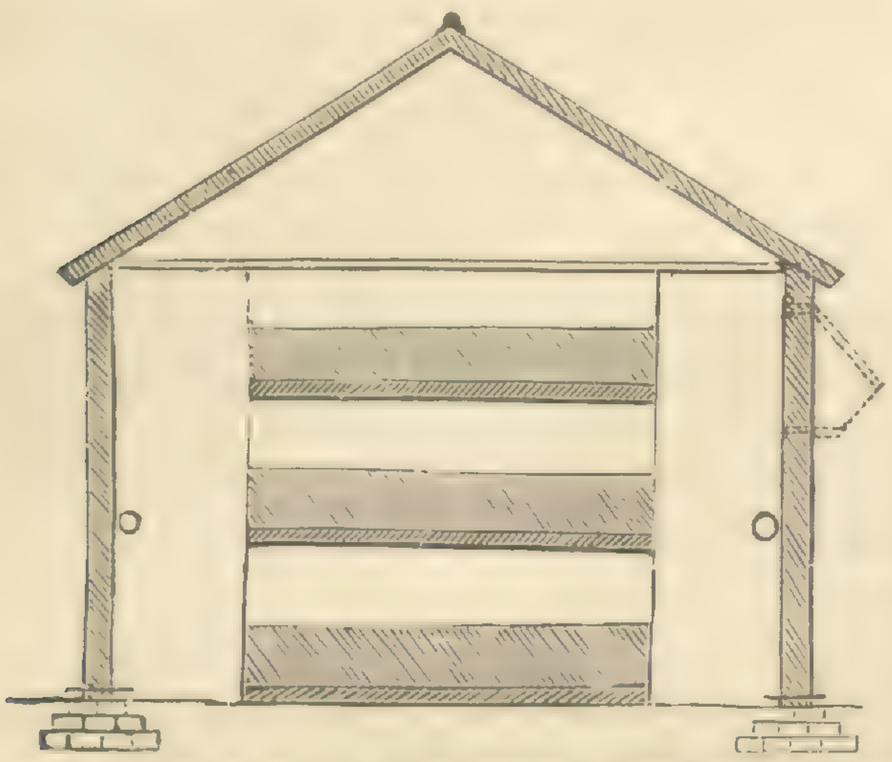

FIG. 618. SECTION OF SPAN-ROOFED MUSHROOM HOUSE.

provision is made for placing three beds one above the other. Two are usually enough in a house of any shape, unless it is very lofty, as a greater space is then available for making up and ramming each bed separately.

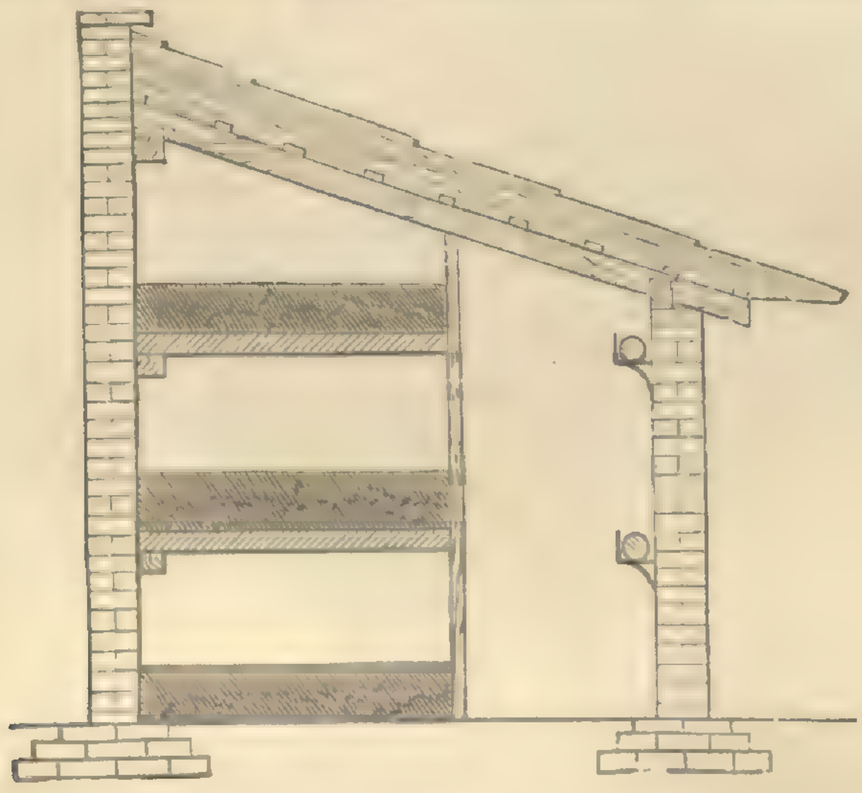

FIG. 619. SECTION OF LEAN-TO MUSHROOM HOUSE.

No light is necessary for the Mushrooms; but provision should be made for admitting it, to see how to work, and darkened shutters may be placed against the windows at other times. The temperature should be kept as near as possible at 50deg., to suit the beds that are bearing; the heat of other beds may be regulated by coverings of litter, or by movable shutters made to rest

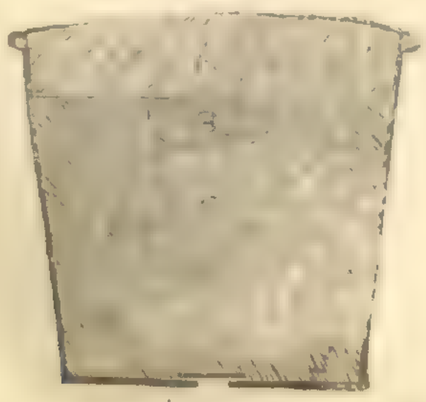

FIG. 620. MUSHROOM POT.

on fixed ledges 3in. above the surface, so as to inclose the bed and retain its heat. Mushrooms are sometimes

Mushrooms—*continued.*

successfully grown on a small scale in tubs or in large pots, as shown in Fig. 620, where A represents the loam on the surface, B the place for inserting some spawn, which would, however, be much better distributed in small pieces, and C the prepared manure. Good results are not unfrequently obtained by this method; but it is not worth practising where a more extensive plan can be adopted.

MUSK. *See* **Mimulus moschatus.**

MUSK BEETLE (*Aromia moschata*). This insect is of rather large size (1in. to 1¼in. long), and belongs to the group of *Longicornia*, or long-horned beetles. The antennæ are eleven-jointed, and, in the male, are longer than the body. The beetles are readily recognised by the smell of musk emitted by them (whence their popular name), and by their colour, which is shining metallic green on the body, passing into blue-black on the legs and antennæ. They can make a sound by rubbing the neck-shield on the meso-thorax. These insects, where common, as they are in various parts of the South of England, do great damage to Willows, by feeding, as larvæ, for several years in the stems of the older trees. The larvæ may grow to the size of over 1in. long, by ⅓in. broad. They are yellowish in colour, with darker plates and folds on certain parts, and are somewhat depressed in form, broadest just behind the small head, thence tapering gradually. The segments are well marked off from one another by constrictions. By means of powerful jaws, the larvæ are able to feed on the wood, and often cause the trees to decay. When full fed, they form cocoons in their galleries, and there change into pupæ. The beetles emerge in July and August, and may be found on Willow stems, or, in fine weather, flying around the trees.

Remedies. The beetles should be collected and destroyed. The larvæ may occasionally be exterminated by means of a sharp wire pushed into the holes; or by paraffin, or some other insecticide, injected from a syringe. Trees which are much infested should be destroyed.

MUSK MELON. *See* **Cucurbita moschata.**

MUSK ORCHIS. *See* **Herminium.**

MUSSÆNDA (a name applied by the Cingalese to some of the species). ORD. *Rubiaceæ*. This genus com-

FIG. 621. MUSSÆNDA MACROPHYLLA.

Mussænda—*continued.*

prises about forty species of mostly stove shrubs or sub-shrubs, rarely herbs, erect or twining, natives of tropical Africa, Asia, and the Pacific Islands. Flowers yellowish, rarely white, in many-flowered terminal corymbs; corolla funnel-shaped, with a five-parted limb and a villous throat. Fruit ovoid, fleshy, naked at the apex from the calyx being deciduous. Leaves ovate, petiolate, villous or glabrous. Several of the species are cultivated chiefly on account of the large coloured floral leaves or bracts, which are formed by the enlargement of one of the calyx segments. Mussændas are of easy culture in a compost of peat, loam, and leaf mould, in equal proportions, to which may be added a small quantity of silver sand. Propagated, during May or June, by cuttings, inserted in sandy soil, under a bell glass, in heat. The four undermentioned species are probably the only ones now in cultivation.

M. frondosa (leafy). *fl.* yellow; tube of corolla one-third longer than the calyx. May to September. *l.* stalked, oval-lanceolate, and, as well as branches, pubescent. *h.* 3ft. Tropical Asia, 1805. Erect shrub. (B. R. 517; B. M. 2099, under name of *M. pubescens*.)

M. luteola (yellow).* *fl.* bright yellow, with an orange centre, 1in. long, slender, the bract-formed calycine leaf ¾in. long, and pure white; corymbs terminal, trichotomous. Autumn and winter. *l.* almost sessile, ovate-lanceolate, acute, nerved, tomentose beneath. *h.* 5ft. to 6ft. Tropical Africa. A very pretty, erect, greenhouse shrub. (B. M. 5573.)

M. macrophylla (large-leaved). *fl.* orange, in terminal, trichotomous corymbs; large segment of calyx white. July and August. *l.* ovate, downy. Stem simple, ascending. *h.* 6ft. Tropical Asia, 1845. Shrub. See Fig. 621. (B. R. 1846, 24.)

M. pubescens (downy). A synonym of *M. frondosa*.

M. uniflora (one-flowered). *fl.* white, sweet-scented, solitary, with a long tube. *l.* opposite, cordate-ovate, sub-sessile. Stem slender. Cochin China, &c., 1883. A pretty, vigorous, and free-flowering herb, suitable for basket culture.

MUSSCHIA (named after J. H. Mussche, once Director of the Botanic Garden at Ghent, which he catalogued in 1810). ORD. *Campanulaceæ*. A genus comprising a couple of species of greenhouse, erect, perennial herbs or sub-shrubs, natives of the island of Madeira. Flowers large, in pyramidal panicles; corolla yellow or ochre-coloured; calyx lobes of a like colour, or livid purple. Radical leaves large, dentate; cauline ones smaller or few. Musschias thrive in well-drained fibry loam, and are propagated by seeds, sown in a gentle bottom heat.

M. aurea (golden).* *fl.* golden-yellow, erect, in loose panicles. Summer. *l.* crowded, glabrous, lanceolate, dentate. Stem short, stout. *h.* 1ft. to 2ft. 1777. SYN. *Campanula aurea*. (B. M. 6556.)

M. Wollastoni (Wollaston's). *fl.* yellow-green, large, 1½in. to 2in. long; calyx lobes oblong-lanceolate, acuminate; corolla tube cylindrical, shorter than the linear recurved lobes; stigmas radiating, ½in. long, revolute at apex; panicle erect, 2ft. high and upwards, with spreading branches. *l.* flaccid, 1ft. to 2ft. long, often purplish, oblong-lanceolate, tapering to a broad sessile base, doubly serrate, succulent towards the middle. *h.* 2ft. to 6ft. 1857. (B. M. 5606.)

MUSSEL SCALE. *See* **Apple Mussel Scale.**

MUSTARD (*Sinapis alba*). As a small salading at any time of the year, Mustard is largely cultivated for use along with Common Cress (*Lepidium sativum*). It is a hardy annual, a native of Britain, and may be raised in any quantity from seed, in the way recommended for Cress (*see* **Cress, Garden**). The seeds germinate quicker than those of Cress, consequently the latter should be sown about three days in advance, in order that the produce from both may be in the proper condition for cutting at the same time. The common White Mustard is the one in general use as a salad plant; but this, as well as the Black (*Sinapis nigra*), is extensively cultivated for its seed, which, after preparation, constitutes the table Mustard of commerce.

MUSTARD, HEDGE. *See* **Erysimum.**

MUTICOUS. Pointless.

MUTISIA (named after J. C. Mutis, 1732-1808, a South American botanist). ORD. *Compositæ*. A genus

Mutisia—*continued.*

of about thirty-six species of stove, greenhouse, or hardy, erect or climbing shrubs, natives of the Andes or extra-tropical South America, with a few Brazilian. Flower-heads purple, rose, or yellow, large, solitary, terminal, peduncular; involucre usually cylindrical, with broad imbricated scales; receptacle naked; pappus of long feathery bristles. Leaves alternate, entire or pinnate, often terminating in a tendril. The stove and greenhouse species, which are not often seen in cultivation, thrive best in a rich, stiff, loamy soil; and may be propagated, in May, by cuttings of half-ripened shoots, placed in sand, under a bell glass, in gentle bottom heat. The hardy sorts do well grown against a sunny wall, in the open air, and in a moderately good soil; they are also increased, during spring, by cuttings, treated as above mentioned, but without bottom heat. The species best known to cultivation are described below.

M. arachnoidea (cobweb-like). *fl.-heads* red, solitary. July. *l.* pinnate; leaflets six or seven, ovate-lanceolate, very acute, sessile, cobwebbed beneath, terminated by a large branching tendril. Brazil, 1824. Stove climber. SYN. *M. speciosa*. (B. M. 2703.)

M. Clematis (Clematis). *fl.-heads* rich red, large. *l.* compound, with from seven to nine pairs of leaflets, ending in a branched tendril. Stems somewhat angular and slender, 20ft. to 30ft. in height. New Grenada, 1859. A distinct species, probably hardy in the Southern Counties of England. (B. H. 1864, 5.)

M. decurrens (decurrent).* *fl.-heads* deep orange, 4in. to 6in. across, on stalks 6in. to 12in. long; outer florets from twelve to twenty, rather long, narrow, reflexed. June to August. *l.* lanceolate, glaucous, with a tendril. Stems few, slender, twining. Chilian Andes. A handsome hardy perennial, thriving best when grown in partial shade, and against a wall. (B. M. 5273; F. d. S. 2408.)

M. ilicifolia (Holly-leaved). *fl.-heads* varying in colour from white to deep rose, rather small. Summer. *l.* dark green, Holly-like. Stems slender. South America, 1832. A very handsome stove or greenhouse climber. (B. M. 6009.)

M. latifolia (broad-leaved). *fl.-heads* pink and yellow. Autumn. *l.* cordate-oblong, dentate-spinose, woolly beneath, with a petiole. Stems with broad leafy wings. Valparaiso, 1832. A handsome and singular, hardy or half-hardy, evergreen, climbing shrub, thriving best in a dry soil, and against a wall. (S. B. F. G. ser. ii. 288.)

M. speciosa (showy). A synonym of *M. arachnoidea*.

MYANTHUS (from *myia*, a fly, and *anthos*, a flower; in reference to its appearance when dried). Flywort. ORD. *Orchideæ*. A group of orchids, distinguished by having two tendrils at the base of the column, instead of at its apex, as in *Catasetum* (with which genus it is now united). Plants have been found bearing flowers of the three supposed genera—viz., *Catasetum*, *Monachanthus*, and *Myanthus*—on one spike.

MYCELIUM. The name given to the vegetative part of fungi as contrasted with the reproductive organs. Fungi, except the lowest forms, are made up chiefly of long, slender threads, composed of rows of cells placed end to end; these threads usually branch, and are interwoven, so as to form a tissue that seems frequently composed of cells united in the way observed among other plants, though really only a false parenchyma. A good many kinds of fungi, supposed to be distinct, are really barren Mycelium only. Hence, with wider information, several of the genera have had to be included as mere forms of other groups. Mycelium is usually easily detected in the cells of parts attacked by a fungus. Occasionally, the presence of Mycelia alters the colour of the wood, *e.g.*, *Peziza æruginosa* so colours the wood that it becomes coppery-green. *See also* **Mushrooms.**

MYGINDA (named after Francis Von Mygind, 1710-1789, a German botanist). SYN. *Rhacoma*. ORD. *Celastrineæ*. A genus comprising about eight species of stove or hardy, glabrous or pilose shrubs, natives of tropical America (Brazil excepted) and Chili. Flowers small or minute, at the tips of the very short or elongated, sub-cymose peduncles, or sub-solitary, often in fours; calyx

Myginda—*continued.*

small; petals four or five, reflexed. Leaves opposite, alternate, or whorled (in one species distichous), variable in form, entire or crenated. *M. latifolia*, the species best known to gardeners, thrives in almost any moderately good light soil. Propagated in autumn, by cuttings of the ripened shoots, placed in sand, under a glass, in heat.

M. latifolia (broad-leaved). *fl.* white, small; peduncles trifid, few-flowered. April and May. *l.* elliptical, crenate, smooth, shortly stalked, coriaceous. *h.* 3ft. West Indies, 1795. Stove.

M. myrtifolia (Myrtle-leaved). A synonym of *Pachystima Myrsinites.*

MYLOCARYUM (from *myle*, a mill, and *karyon*, a nut; the dry seeds have four wings like a windmill). Buckwheat-tree. ORD. *Cyrilleæ*. A monotypic genus, the proper name of which is *Cliftonia*. The species is a half-hardy evergreen shrub, thriving in a compost of sandy loam and dried leaf mould; it requires a sheltered, warm border, but does best under cool greenhouse treatment. Propagated by cuttings of half-ripened shoots, inserted in sand, under a glass.

M. ligustrinum (Ligustrum-like). *fl.* white, fragrant; racemes spiked, terminal. May. *l.* cuneate-lanceolate, acute. *h.* 8ft. South United States. (B. M. 1625.) The proper name of this plant is now *Cliftonia ligustrina.*

MYOPORINEÆ. A natural order of erect or diffuse shrubs, rarely trees or sub-shrubs, natives, for the most part, of Australia, a few dispersed through the Southern islands from Mauritius as far as the Sandwich Islands, two in South Africa, two in the states of Japan or China, and one in the West Indies. Flowers axillary, solitary or fasciculate, sub-sessile or pedicellate. Leaves alternate, scattered, or rarely opposite, entire or rarely dentate, undivided, exstipulate. The order comprises five genera and about eighty species. Illustrative genera are: *Myoporum* and *Oftia.*

FIG. 622. FLOWERING BRANCHLET OF MYOPORUM PARVIFOLIUM.

MYOPORUM (from *myo*, to shut, and *poros*, a pore, or opening; referring to the transparent spots on the leaves). SYNS. *Andreusia*, *Pogonia* (of Andrews). ORD.

Myoporum—*continued.*

Myoporineæ. This genus comprises about twenty species of erect, tall, or diffuse, greenhouse shrubs, rarely sub-shrubs, inhabiting Australia, New Zealand, the Mascarene Islands, the Malayan Archipelago, the islands of the Pacific, China, and Japan. Flowers often white, small or medium; corolla tube very short or cylindrical, sub-campanulate or funnel-shaped; pedicels axillary, often fasciculate. Leaves alternate or rarely opposite, entire or dentate. The species thrive in a compost of loam and peat, with a small quantity of sand added. Propagated by cuttings of the young shoots, taken during April, and inserted in sand, under a bell glass. The species are rarely seen in cultivation. All those described below are natives of Australia.

M. acuminatum (acuminate). *fl.* white; corolla almost campanulate, more or less bearded inside. March. *l.* alternate, varying from elliptic-oblong to lanceolate or linear. *h.* 3ft. 1812.

M. debile (weak). *fl.* pink or purplish. June. *l.* alternate, shortly petiolate or nearly sessile, elliptic, oblong, or lanceolate, entire or toothed. *h.* 1½ft. 1793.

M. parvifolium (small-leaved). *fl.* white, solitary, or two or three together. June. *l.* scattered, rather crowded, linear or linear-spathulate, sometimes under ½in. long. *h.* 3ft. 1803. See Fig. 622. (B. M. 1693.)

M. serratum (saw-toothed). *fl.* white and purple, several in each axil. May. *l.* generally elliptic-oblong or lanceolate, obtuse or acute, and more or less serrate, but in some maritime species nearly all entire. *h.* 2ft. The leaves and flowers of this species are very variable.

MYOSOTIDIUM (from *Myosotis*, and *eidos*, resembling; flowers like those of *Myosotis*). ORD. *Borragineæ*. A monotypic genus, the species being a very handsome hardy, or nearly hardy, herbaceous perennial, resembling a gigantic Forget-me-not. This plant is very difficult to cultivate; it is most impatient of root disturbance, and seems to do best in a cool, damp, sheltered spot outdoors.

M. nobile (noble). *fl.* white, with blue centres, about ½in. across, disposed in very large and dense racemes; corolla salver-shaped, with a very short tube. Spring. *l.* large, fleshy, glabrous, shining, plicate. *h.* 1½ft. Chatham Islands, 1858. (B. M. 5137.)

MYOSOTIS (the Greek name used by Dioscorides, and derived from *mys, myos*, a mouse, and *ous, otos*, an ear; supposed resemblance in leaves). Forget-me-not. ORD. *Borragineæ*. A rather large genus (more than forty

FIG. 623. MYOSOTIS ALPESTRIS, showing Habit, single detached Leaf, and Inflorescence.

species have been described by various authors) of very pretty and elegant hardy annuals or perennials, natives of North and South temperate regions, most common in Europe and Australia. Flowers blue, pink, or white, in terminal scorpioid cymes, bracteate or not. Radical leaves stalked, cauline ones sessile, linear-oblong. The species are of very easy culture in moist and shady places. All are propagated by seeds, sown in spring, on a warm sunny border. The perennials may also be increased by divisions of the roots, in spring; or by cuttings, placed under a hand light, in a shady spot, in summer.

Myosotis—*continued.*

M. alpestris (alpine).* *fl.* blue, with a very small yellowish eye, fragrant in the evening. Summer. *l.* lanceolate or oblong-linear, acutish, obsoletely three-nerved, strigose. Stems tufted, erect, beset with adpressed hairs, simple at bottom, but divided at top into short racemes. *h.* 2in. to 3in. Mountains of Europe (Britain). Perennial. According to some authorities, this is but a form of *M. sylvatica*, with larger flowers. SYN. *M. rupicola.* See Fig. 623. (Sy. En. B. 1106.)

M. azorica (Azorean).* *fl.* purple, eventually blue, without a yellow eye, about ½in. across, disposed in dense bractless racemes. Summer. *l.* hairy, upper ones oblong-obtuse, lower ones oblong-spathulate. *h.* 6in. to 10in. Azores, 1846. An elegant but somewhat tender perennial, with a habit similar to *M. alpestris*, but the flowers are larger, and the fruiting racemes lengthen considerably. (B. M. 4122.) There is a white-flowered form, *alba.* The garden form of this species known as IMPERATRICE ELIZABETH forms a branching bush about 6in. in height, and, when covered with its numerous heads of bluish-purple flowers, is a gem for pots or shady nooks in the rockery.

M. dissitiflora (distant-flowered).* *fl.* deep sky-blue, large, numerous. Very early spring. *l.* oblong-lanceolate, gradually pointed. *h.* 6in. to 12in. Switzerland, 1868. Perennial. A handsome species, closely allied to *M. sylvatica*, but differing in its shorter, more adpressed pubescence, brighter green leaves, and relatively longer pedicels, which curve upwards and inwards when in fruit. The most distinctive character, however, which separates *M. dissitiflora* and *M. sylvatica* resides in the nutlets (the so-called seeds), which are stalked in the former and stalkless in the latter.

FIG. 624. MYOSOTIS DISSITIFLORA ELEGANTISSIMA.

M. d. elegantissima (very elegant). A pretty variety, with white-edged leaves. See Fig. 624.

M. macrophylla. *See* **Anchusa myosotidiflora.**

M. obtusum. *See* **Anchusa Barrelieri.**

M. palustris (marsh).* True Forget-me-not. *fl.* blue, with a yellow throat; racemes simple or conjugate, bractless. Spring. *l.* oblong or spathulate, upper ones slightly decurrent, all bright glossy green. Stems creeping at the base, clothed with adpressed hairs. *h.* 6in. to 12in. Europe, &c. (Britain). A well-known and very lovely native perennial. (Sy. En. B. 1104.)

M. rupicola (rock-loving). A synonym of *M. alpestris.*

M. suaveolens (sweet-scented). *fl.* white or bluish, in simple or branched racemes, at first dense, at length several inches long; the pedicels short. *l.* oblong-linear or lanceolate, mostly acute, sessile, and broad at the base, or contracted into a short petiole, often decurrent; the lower ones sometimes 3in. to 4in. long, the upper ones small. Australia. An erect, but sometimes weak perennial.

M. sylvatica (wood).* *fl.* blue, with a yellow throat; racemes solitary and conjugate, very long, loose, bractless; pedicels much longer than the calyx. Spring. *l.* oblong-lanceolate, bluntish, clothed with soft hairs. Stems simple, divided at top into long loose racemes, hairy. *h.* 1ft. to 2ft. Europe, &c. (Britain). A handsome biennial or perennial species, of which there are numerous varieties. (Sy. En. B. 1107.)

M. virginica. *See* **Echinospermum virginicum.**

MYRCIA (a mythological name). ORD. *Myrtaceæ.* A very large genus (some 500 species have been described, but the number may probably be reduced to about 300) of stove trees or shrubs, all natives of tropical and sub-tropical America. Flowers often small; peduncles axillary, sub-terminal, many or rarely few-flowered; calyx limb segments and petals five, rarely four or three.

Myrcia—*continued.*

Leaves opposite, penniveined. The species are not much seen in cultivation; the under-mentioned is, perhaps, the best for horticultural purposes. It thrives in a compost of sandy peat and fibry loam. Propagated, in May, by cuttings of young shoots, rather firm at the base, inserted in sand, under a bell glass, in gentle bottom heat.

M. acris (sharp). A synonym of *Pimenta acris.*

M. amplexicaulis (stem-clasping). *fl.* white, fascicled on the branches, sessile, ¾in. in diameter; panicles downy, from the upper axils, 6in. to 10in. long. *l.* opposite, sessile, 10in. to 16in. long, narrow-oblong or linear-oblong, acuminate, downy on both surfaces, reticulated above; lateral nerves below numerous, very divergent, elevated. Branches strict, erect, terete, stout; branchlets as thick as a goose-quill. *h.* 5ft. Rio de Janeiro, 1869. A very handsome shrub. (B. M. 5790.)

MYRIAPODA. An order of *Articulata*, or jointed animals, greatly resembling insects in being made up of horny rings (chitine), held together by soft membranes between them, as well as in breathing by air tubes (tracheæ) branching all through the body and opening on its surface by little mouths (spiracles), across each of which lies a structure like a sieve, that prevents the entrance of dust with the air. These animals also agree with insects in the general structure of the internal organs; in having a distinct head with one pair of antennæ or feelers, and simple eyes, usually in a group on each side, and legs made up of several distinct joints. They differ from insects in having no well-defined thorax, in the rings of the body being very numerous, and in their numerous pairs of legs, whence the popular names of Centipede and Millipede. The eggs are laid in the localities frequented by the animals, such as below stones, dead leaves, &c. The young ones, on emerging from the eggs, have only three pairs of true legs; but, at each change of skin during their growth, the number of the legs increases, as does also the number of simple eyes. Hence, till maturity is reached, the numbers of legs and eyes are too variable with age to permit of laying much stress upon them in determining species. *Myriapoda* usually feed upon insects, or upon plants; most frequently they feed on decaying parts of plants, but a few also attack living cultivated plants, and injure them considerably. They belong chiefly to two great groups, the Centipedes (*Chilopoda*) and the Millipedes (*Chilognatha*), and may be readily distinguished from one another by the following characters.

Centipedes have, for the most part, flattened depressed bodies, with only one pair of legs on each ring of the body. The lower surface of each ring is formed by a flat plate, which keeps the legs apart, so that they are seen projecting beyond the sides of the rings when the animals are crawling. The last pair of legs is longer and stronger than the others, and projects backwards. The front pair is modified to form two tapering, sharp-pointed, jaw-like organs, which can be made to pierce the skin of the animals that serve as food. Each of these organs is traversed by a tube that conveys poison from a gland near the head into the wound in the bodies of the prey, or those of assailants if being used in self-defence. Our native species are all of small size (½in. to 3in. long, and quite slender), but many tropical species are from 6in. to 12in. long, and give a very painful or even dangerous bite. Centipedes mostly feed on insects, or on others of the lower animals; hence, they are beneficial to gardeners. They are often met with in digging gardens. One kind (*Scolopendra electricus*, or *Geophilus longicornis*), sparingly met with in England, has the power of emitting a feeble light at times.

The Millipedes (*Chilognatha*) are easily recognised by their legs being more numerous than those of Centipedes,

Myriapoda—*continued.*

each of the rings behind the three that immediately follow the head seeming to bear two pairs. The legs are also inserted close to the middle line below, and are too short to project beyond the sides of the body when the animal is walking. The body is usually nearly cylindrical, less often depressed. This group possess no poison fangs. For further particulars regarding these animals and their relation to horticulture, *see* **Millipedes.**

MYRICA (from *Myrike*, the old Greek name, used by Homer, for the Tamarisk). Candleberry Myrtle. The only genus of ORD. *Myricaceæ* (which *see* for characters). Myricas thrive in moist and sandy peat. The

FIG 626. FLOWERING BRANCH OF MYRICA GALE.

greenhouse species are propagated by cuttings, taken during spring or autumn, and inserted under a hand glass, in a shady situation. The hardy ones may be

Myrica—*continued.*

increased by seeds, sown as soon as ripe; by layers, by cuttings, or by divisions.

M. californica (Californian). *fl.* greenish, monœcious. *fr.* purple, papillose, thinly coated with greyish-white wax. *l.* oblanceolate, thick, slightly tomentose below, 2in. to 4in. long, acute. A hardy evergreen shrub; in a wild state, it sometimes attains a height of 30ft. to 40ft. See Fig. 625.

M. cerifera (wax-bearing). Common Candleberry Myrtle. *fl.* reddish. May. *l.* lanceolate, pointed, serrated, flat, shining. *h.* 5ft. to 12ft. Canada, 1699. A small, hardy, evergreen shrub.

M. Gale (Gale). Sweet Gale. *fl.* brownish-green. February and March. *l.* lanceolate, serrated, tapering and entire at the base. *h.* 2ft. to 4ft. Europe (Britain), North Asia, and North America. A dwarf, fragrant, hardy, deciduous shrub. See Fig. 626. (Sy. En. B. 1248.)

M. Nagi (Nagi). *fl.* greenish. *fr.* edible, deep red-purple, oblong or globose, studded with mamillary tubercles, and with a juicy acid flesh of soft radiating fibres. *l.* cuneate-lanceolate, serrated above the middle. China and Japan, 1868. Greenhouse shrub or small tree. (B. M. 5727.)

M. quercifolia (Oak-leaved). *fl.* greenish. June. *l.* rigid, coriaceous, oblong, cuneate at the base, with sinuated margins. *h.* 3ft. Cape of Good Hope, 1752. Greenhouse evergreen shrub.

MYRICACEÆ. A natural order of trees or shrubs, often aromatic, widely dispersed over Europe, temperate and tropical Asia, South Africa, and North America, often abounding in dots and glands filled with aromatic secretions. Flowers unisexual; males in cylindrical sessile catkins; females in ovate sessile catkins, with closely imbricated bracts. Fruit a globose or ovoid drupe, often covered with waxy papillæ. Leaves evergreen or deciduous, alternate, penniveined, entire, serrate, irregularly dentate or lobed or regularly pinnatifid, with a single exception exstipulate. The bark of several *Myricaceæ* contains a resinous substance, which gives it astringent tonic properties; wax, benzoic acid, and tannin, are also yielded. The order contains but one genus—*Myrica*—and about thirty-five species.

MYRICARIA (a Latinised form of *Myrike*, the old Greek name, used by Homer, for the Tamarisk, to which the present genus is nearly allied). ORD. *Tamariscineæ*. A genus of about four species of hardy deciduous shrubs or sub-shrubs, natives of Europe and Central Asia. Flowers rose or white, in long, terminal, spike-like racemes; stamens ten, style absent, stigma capitate. Leaves small, Heath-like. Myricarias thrive in sandy spots, but hardly seem particular to soil. Propagated by seeds, sown in spring, in the open air; or from cuttings of firm young wood. The only species worth mentioning here is the following:

M. germanica (German). *fl.* white or rose-tinted, stalked, in spike-like racemes, attenuated above, lax below; petals lanceolate, acute. Summer. *l.* glaucescent, linear, obtuse, punctate. Stem woody, erect, much-branched; branches rigid, erect, slightly angular. *h.* 3ft. to 6ft. Europe, Asia, 1582. (B. F. F. 8.)

FIG. 625. FLOWERING BRANCH OF MYRICA CALIFORNICA.

MYRIOPHYLLUM (the old Greek name used by Dioscorides, from *myrios*, myriad, and *phyllon*, a leaf; in reference to the numerous divisions of the leaves). Water Milfoil. Including *Pelonastes*. ORD. *Haloragea*. A genus of about fifteen species of hardy, half-hardy, or greenhouse, floating, aquatic herbs (rising above the water to flower), found in all parts of the world. Flowers small, disposed in axillary whorls; upper ones male, lower ones female. Leaves finely cut, opposite or verticillate. Very few species are worth growing. They are propagated chiefly by divisions. Three species are represented in the British Flora, but they are not of any value from a horticultural standpoint.

M. proserpinacoides (Proserpinaca-like). *fl.* very minute, *l.* in whorls of five, very finely pectinated. Brazil, Chili, &c., 1879. A graceful half-hardy aquatic, with an extremely pretty feathery appearance. It requires mud to root in, and is easily increased. The stems are weak, but do not require support, all the pretty points of the shoots growing out of the water, perhaps to a height of 6in. or 8in. SYN. *Herpestes reflexa* (of gardens).

MYRIOPTERIS. Included under *Cheilanthes*.

MYRISTICA (from *myristikos*, smelling of myrrh, from *myron*, myrrh). Nutmeg. The only genus of ORD. *Myristicea* (which *see* for characters, &c.). The undermentioned stove evergreen tree is the only species which calls for description here. It thrives in a sandy-loam and fibry-peat compost. Propagated by cuttings of ripened shoots, inserted in sand, under a bell glass, in bottom heat.

M. fragrans (fragrant). True Nutmeg. *fl.* pale yellow. June. *fr.* very much like a Peach, having a longitudinal groove on one side. *l.* alternate, entire, oblong, aromatic. *h.* 30ft. Indian Archipelago, 1795. "The Nutmeg consists of the albumen or perisperm, with the embryo at one end, and is covered by a thin membrane, which adheres closely to its surface, and projects into the substance of the albumen, thereby giving it the mottled appearance for which it is so remarkable" (Masters). SYN. *M. moschata*. (B. M. Pl. 218.)

M. moschata (musk). A synonym of *M. fragrans*.

MYRISTICEÆ. A natural order of trees and shrubs, having a styptic juice which reddens when in contact with the air, natives, for the most part, of tropical Asia and America, a few in Africa, and one each in Madagascar and Australia. Flowers white or yellow, dicecious, usually axillary, in racemes, clusters, heads, or panicles, inconspicuous. Fruit succulent, one-celled, two (rarely four) valved; seed solitary, usually covered by a laciniate, often aromatic axil; albumen scented. Leaves alternate, nearly distichous, shortly petioled, coriaceous, simple, entire, penninerved, folded lengthwise when young, pubescent or scaly, exstipulate. *Myristicea* furnishes the well-known Nutmeg and Mace of commerce. It contains but a single genus—*Myristica*—and about eighty species.

MYROBALAN PLUM. *See* **Prunus cerasifera.**

MYRODIA (from *myron*, myrrh, perfume, and *odme*, scent). SYN. *Lexarsa*. ORD. *Sterculiaceæ*. A genus comprising about seven species of stove evergreen shrubs or trees, with an aromatic odour, confined to tropical America. Petals white, oblong; peduncles opposite the leaves, short, one-flowered. Leaves entire or obsoletely toothed, penninerved, or irregularly three to five-nerved at base. Only one species has yet been introduced; it thrives in a rich sandy-loam soil. Propagated by cuttings of half-ripened shoots, placed in sand, under a glass, in heat.

M. turbinata (turbinate). *fl.* white, very fragrant; peduncles nearly as long as the petioles. May. *l.* elliptical, quite entire. Branches few. *h.* 8ft. 1793. Shrub.

MYROSPERMUM (from *myron*, myrrh, and *sperma*, a seed; in reference to the seeds yielding a strong-smelling resin). ORD. *Leguminosæ*. A monotypic genus, the species being a stove evergreen tree, native of tropical America. For culture, *see* **Myroxylon.**

M. frutescens (shrubby). *fl.* whitish-rose, disposed in terminal, simple or bifid racemes. May. *l.* alternate, pinnate, deciduous,

Myrospermum—*continued.*

with commonly three pairs of leaflets and an odd one, which are quite entire and smooth. *h.* 10ft.

MYROXYLON (from *myron*, myrrh, and *xylon*, wood; the wood is resinous and sweet-scented). Tolu Balsam-tree. SYN. *Toluifera*. ORD. *Leguminosæ*. This genus contains about six species of stove evergreen trees, natives of tropical America. Flowers in axillary or terminal clusters. Leaves impari-pinnate, marked with pellucid dots. The species thrive in a compost of loam and peat, to which may be added a small quantity of silver sand and leaf mould. Propagated, during summer, by cuttings of half-ripened shoots, placed in sand, under a bell glass, in bottom heat. The most important species are given below.

M. peruiferum (Peru Balsam-bearing). Peru Balsam-tree. *fl.* white, disposed in axillary racemes. *l.* coriaceous, abruptly pinnate, usually with about two pairs of ovate-lanceolate, entire, emarginate leaflets, which are full of transparent, linear, resinous dots. *h.* 40ft. Peru, &c., 1824. A very beautiful tree, long supposed (but erroneously) to be the source of Balsam of Peru.

M. pubescens (downy). *fl.* white, disposed in terminal racemes. August. *l.* rather membranous, ovate-lanceolate or oblong, smooth above and pubescent beneath, emarginate. Branches and petioles hairy. *h.* 40ft. South America, 1820. An elegant tree, the bark of which is filled with white resin.

M. Toluiferum (Tolu Balsam-bearing). Tolu Balsam-tree. *fl.* yellowish, disposed in small axillary racemes. *l.* oblong-ovate; leaflets oblong, acuminated, equal-sided, rounded at the base. Branches and leaves glabrous. *h.* 40ft. South America, 1733. A large, spreading tree, with very thick, rough, brown bark. The balsam flows from incisions made in the bark, during the hot season; its smell is extremely fragrant, somewhat resembling that of lemon, and its taste is warm and rather sweet. (B. M. Pl. 84, under name of *Toluifera Balsamum*.)

MYRRHIS (the old Greek name used by Dioscorides, probably from *myrrha*, myrrh; in allusion to the scent of the plants). Sweet Cicely or Myrrh. ORD. *Umbelliferæ*. A genus comprising only a couple of species of hairy, hardy, perennial herbs, with the habit of *Chærophyllum*; one is an inhabitant of the mountains of Europe and the Caucasus region, and the other is North American. Flowers white, polygamous; petals cuneate, obovate, or oblong; umbels compound; involucres one, two, or many-bracteate. Leaves pinnately-decompound; segments pinnatifid or toothed. The only species worth notice is the native *M. odorata*. This is a very graceful-looking plant, and is suitable for naturalising in many situations, such as in wild gardens and semi-wild spots generally. It thrives in almost any soil, and may be propagated by divisions or by seeds.

M. odorata (sweet-scented).* *fl.* white, in terminal compound umbels; involucels of many lanceolate ciliated leaves. May. *fr.* nearly 1in. long, with five very prominent ribs, usually clothed with minute stiff hairs. *l.* ternately decompound; leaflets pinnatifid. *h.* 2ft. to 3ft. Britain, France, eastward to Caucasus. Once cultivated as a pot-herb, and still used in salads in Italy. (Sy. En. B. 626.)

MYRSINE (the old Greek name given by Dioscorides to the Myrtle). SYNS. *Athrophyllum*, *Caballeria*, *Manglilla*, *Rapanea*, *Samara*, and *Sclerocylon*. ORD. *Myrsineæ*. This genus contains about eighty species of stove or greenhouse, glabrous trees or shrubs, rarely pubescent or tomentose, natives, for the most part, of Asia, Africa, or tropical America; a few are indigenous in Japan, extra-tropical Africa, Australia, the islands of the Atlantic, and New Zealand. Flowers small, disposed in axillary fascicles, sessile or pedunculate. Leaves coriaceous, entire, rarely serrulate. The species best known to cultivation are described below. For culture, *see* **Ardisia.**

M. africana (African). *fl.* pale, axillary, by threes; petals ciliated. March to May. *l.* elliptic, serrated, acute, dotted. *h.* 3ft. to 6ft. Cape of Good Hope, 1691. Greenhouse shrub.

M. capitellata (small-headed). *fl.* pale yellowish-green, small, in axillary, sessile, crowded heads. January. *l.* 5in. to 6in. long, oblong-lanceolate, rather acute, coriaceous, shortly petioled, quite entire, dark green above, paler beneath. *h.* 4ft. (in its native country a tree 30ft. to 40ft.). Nepaul, 1828. Stove shrub. (B. M. 3222.)

MYRSINEÆ. An order of trees, shrubs, or sub-shrubs, of variable habit, principally inhabiting the tropical parts of Asia and America; they are rare beyond the tropics, at the Cape of Good Hope, in Australia, New Zealand, Japan, and the Canaries. Flowers white or pink, rarely yellow, purplish, or golden, usually small; inflorescence cymose, umbellate, fasciculate, racemose, or paniculate. Leaves alternate or scattered, very rarely opposite, sometimes sub-verticillate, entire, dentate or rarely serrate, and, for the most part, gland-dotted. The order contains about twenty-three genera and 500 species. Illustrative genera are: *Ægiceras*, *Jacquinea*, *Myrsine*, and *Theophrasta*.

MYRSIPHYLLUM (from *Myrsine*, Myrtle, and *phyllon*, a leaf; leaves aromatic). ORD. *Liliaceæ*. A small genus of greenhouse, deciduous twiners, natives of the Cape of Good Hope, now included, by Bentham and Hooker, under *Asparagus*. Flowers greenish, on nodding pedicels, two or three together at the base of the leaves, from the axils of small white scales; perianth persistent, bell-shaped. Leaves ovate-lanceolate or lanceolate, obliquely cordate at the base. The species most generally grown is *M. asparagoides*, which thrives best if planted in a warm part of the greenhouse, and in a

FIG. 627. MYRSIPHYLLUM ASPARAGOIDES, showing (1) Portion of Flowering Stem, &c., reduced; (2) ditto, natural size; and (3) detached Flower.

prepared bed of loam and leaf soil, where the slender growths can be trained up a pillar or rafter. Plenty of water should be given when the plants are growing. Propagation may be easily effected by seeds, by cuttings, or by divisions of the root.

M. asparagoides (Asparagus-like).* *fl.* greenish or white. June. *l.* small, bright glossy green. Branchlets very pretty, spray-like; these are largely employed in the composition of wreaths, bouquets, &c. 1702. SYN. *Medeola asparagoides*. See Fig. 627. (B. M. 5584.)

MYRTACEÆ. A large order of trees, shrubs, or very rarely sub-shrubs, scarcely ever sub-scandent, inhabiting, for the most part, the tropical regions of the globe. Inflorescence axillary, simple, racemose or racemose-paniculate, rarely cymose. Leaves simple, entire, or rarely obscurely crenate-serrate, opposite or alternate, often dotted from pellucid glands sunk into the parenchyma, narrowed into a petiole at the base (or sessile); stipules usually none, or rarely geminate at the base of the petioles, minute, caducous. The order comprises about seventy-six genera and 1800 species. Illustrative genera are: *Darwinia*, *Hypocalymma*, *Leptospermum*, *Melaleuca*, and *Myrtus*.

MYRTLE. *See* **Myrtus communis.**

MYRTUS (from *Myrtos*, the old Greek name). Myrtle. Including *Luma* and *Ugni*. ORD. *Myrtaceæ*. An extensive genus (upwards of 100 species have been enumerated, but the number may probably be reduced) of stove, greenhouse, or nearly hardy, glabrous, tomentose, or pubescent, shrubs, rarely trees; they are mostly dispersed through tropical, extra-tropical, and Western South, America; eight are found in Australia, six in New Caledonia, four in New Zealand, and one frequently occurs in Europe and Western Asia. Calyx-tube turbinate; lobes and petals four or five, the latter spreading; peduncles axillary, often slender, one to many-flowered; central flowers short, lateral ones on long pedicels. Berry adnate to, or included in, the calyx-tube. Leaves opposite, penniveined. The common species (*M. communis*) and its varieties are popular and well-known plants, with flowers and foliage rather strongly scented. When grown in pots, they are equally well adapted for greenhouse, room, or window decoration. The small branches, especially of the narrow-leaved form, are very useful for intermixing with cut flowers. This species may also be grown against a wall, outside, in many parts, if a slight protection is afforded in winter. *M. Ugni* succeeds well, either planted out, or grown in large pots, in a greenhouse. The fruits, when ripe, are highly flavoured, and emit an agreeable perfume, which pervades the whole house. All Myrtles are of easy culture, in a compost of sandy loam and leaf soil. They are readily propagated by cuttings of firm or partially-ripened shoots, inserted under a glass, or in a close frame, those of the stove species requiring, of course, a warmer temperature than the greenhouse or half-hardy ones. The common species may be trained as tall standards, or in almost any shape desired. An abundance of water, and frequent syringings, are requisite for all Myrtles throughout the summer. The roots should not be allowed to get quite dry at any time.

M. bullata (blistered).* *fl.*, petals pale pink, orbicular peduncles one-flowered. Berry black, urceolate. *l.* shortly petioled, 1in. to 2in. long, broadly elliptic-ovate or orbicular-ovate, obtuse, acute, or apiculate. *h.* 10ft. to 15ft. New Zealand, 1853. Greenhouse shrub. (B. M. 4809.)

M. Cheken (Cheken). *fl.* white, numerous, axillary. *l.* small, closely set, oblong-ovate, obtuse. *h.* 6ft. Chili, 1847. A much-branched and densely-leafy, half-hardy shrub. (B. M. 5644.)

FIG. 628. FLOWERING BRANCHLET OF MYRTUS COMMUNIS.

M. communis (common).* Common Myrtle. *fl.* white; pedicels solitary, one-flowered, about the length of the leaves, bearing two linear bracteoles under the flowers. July. *l.* ovate or lanceolate, acute. *h.* 3ft. to 10ft. South Europe, 1597.

Myrtus—*continued.*

There are a number of varieties of this handsome, strongly scented shrub in cultivation, differing chiefly in the shapes of the leaves; there is also a variegated-leaved form. The typical species proves quite hardy in the South of England. See Fig. 628.

M. fragrans (fragrant). *fl.* white; peduncles nearly as long as the leaves, puberulous. April. *l.* leathery, oval-roundish or obovate, emarginate at top, shining above, black-dotted beneath. *h.* 8ft. Jamaica, 1790. Stove shrub. (B. M. 1242.)

M. Luma (Luma).* *fl.* white, large, on three to five-flowered branched pedicels; petals larger and more concave than in the common Myrtle. Summer. *l.* copious, opposite, nearly sessile, ¾in. long, broad-oval, nearly orbicular, but acute at base, and sharply apiculate at point. *h.* 3ft. and upwards. Chili. Greenhouse shrub. SYNS. *Eugenia apiculata* and *E. Luma*. (B. M. 5040.)

Myrtus—*continued.*

M. orbiculata (orbicular-leaved). A synonym of *Eugenia orbiculata*.

M. tomentosa (tomentose). *fl.* rose; peduncles one to three-flowered, bearing two ovate bracteoles under each flower, shorter than the leaves, velvety. June. *l.* ovate, velvety above in the young state, clothed with hoary tomentum beneath. *h.* 2ft. to 6ft. China, 1776. Greenhouse shrub. (B. M. 250.)

FIG. 629. FRUITING BRANCH OF MYRTUS UGNI.

M. Ugni (Ugni).* *fl.* white; pedicels axillary, one-flowered; calyx lobes reflexed. May. *fr.* globular (crowned with the persistent calyx teeth), red or black, glossy, with an agreeable aroma and pleasant taste; it is much esteemed in Chili. *l.* ovate, acute, glabrous; margins reflexed, dark green above, paler beneath. *h.* 4ft. Valdivia, 1845. Greenhouse shrub (hardy in South-west Britain). See Fig. 629. SYN. *Eugenia Ugni* (under which name it is figured in B. M. 4626).

NABALUS. Included under **Prenanthes** (which *see*).

NACIBEA. A synonym of **Manettia** (which *see*).

NÆGELIA (named after Karl Nægeli, an eminent German botanist, Professor of Botany at Munich). ORD. *Gesneraceæ.* A genus comprising six species of stove herbaceous perennials, with catkin-like scaly stolons, inhabitants of Mexico and Central America. Flowers red, whitish-yellow, or painted, in terminal, leafless, alternate racemes; corolla tube declinate; throat broadly oblique; limb broadly lobed, spreading, rotundate. Leaves opposite, soft, often cordate, on long stalks. Nægelias are exceedingly ornamental plants, both on account of their floriferous habit, and also because of their beautifully marked foliage. This latter should be carefully preserved from drip, and the use of dirty water avoided for syringing purposes; otherwise, a sediment collects amongst the tiny hairs on the surface of the leaves, and renders the whole plant unsightly. The stolons or roots, as they are generally termed, should be potted up in spring or summer, according to the time of year at which the plants are required to flower. A light compost of peat, leaf soil, and a small quantity of loam, is most suitable; it should only be pressed moderately firm in potting. Pots 5in. to 6in. in diameter, are large enough, about three roots being placed in the latter, or only one in the former size, covering them with 1in. of soil. If potting is deferred until after midsummer, the flowering season is often prolonged throughout the winter, especially with *N. cinnabarina*, a late-flowering and beautiful species. When the foliage dies away, the pots, with their contents, should be stored and kept quite dry, until the season for starting arrives again. Nægelias are readily propagated by the increase of stolons; also by cuttings made of the young stems or matured leaves, and inserted in a close propagating frame. *See also* **Gesnera** (under which genus the present one is often included).

N. amabilis (lovely). A synonym of *N. multiflora.*

N. cinnabarina (cinnabar-red). *fl.* scarlet, with a light throat. *l.* cordate, or broadly ovate, green, beautifully shaded with flame-coloured hairs. *h.* 2ft. Mexico, 1856. A very handsome winter-flowering plant. SYN. *Gesnera cinnabarina.* (B. M. 5036.)

N. fulgida (shining). *fl.* vermilion; panicles erect. *l.* broadly ovate, deeply and coarsely toothed at the edges, hairy, of a rich dark green. Veru Cruz, 1864. (R. G. 538.)

N. f. bicolor (two-coloured). *fl.*, upper portion of corolla vermilion, lower barred with white. Garden variety. (F. d. S. 1755.)

N. Geroltiana (Von Gerolt's). *fl.* like those of *N. zebrina.* Nearly throughout the year. *l.* cordate, sub-rotund-acute, coarsely dentate, softly pubescent, dark green. *h.* 1½ft. to 2ft. Mexico, 1844. (F. d. S. ii. April, 4, under name of *Gesnera Geroltiana.*)

N. multiflora (many-flowered). *fl.* white or cream-colour, shorter than the pedicels, drooping; raceme terminal, elongated; corolla with the tube scarcely ventricose, elongated, curved upwards below the very oblique, rather large, spreading, five-lobed limb; calyx almost hispid, with glandular hairs. Autumn. *l.* on long petioles, cordate, crenate. Eastern Cordillera of Oaxaca. (B. M. 5083; F. d. S. 1192, under name of *N. amabilis.*

N. zebrina (zebra-marked). *fl.* bright orange-scarlet, disposed in a long panicle. September. *l.* handsome, dark-marbled. *h.* 2ft. Brazil, 1840. A fine species. SYN. *Gesnera zebrina.* (B. M. 3940; B. R. 1842, 16.)

NAIADACEÆ. An order of marine or fresh-water, annual or perennial herbs, widely distributed over the globe. Flowers hermaphrodite, monœcious or dicœcious, small, often inconspicuous, spicate, racemose, or disposed on pedunculate, terminal, or axillary spadices, bracteate or ebracteate. Leaves submersed, emerging, or floating, in scape-bearing genera radical, linear, or rush-like; stem leaves opposite, alternate, or very rarely ternately whorled, sessile or petiolate, oblong, linear, or capillary, sheathed at base. The order comprises sixteen genera, and about 120 species. Examples: *Aponogeton*, *Naias*, and *Triglochin.*

NAILS. Nails are required in quantity for training fruit-trees and various other plants on garden walls, and are made of cast iron specially for the purpose. Any of another description would bend rather than enter a hard substance, such as that of a brick, while the cast-iron ones may invariably be driven in a horizontal direction far enough to retain a hold. They are said to be much preserved from rust by heating almost to redness before using, and throwing them into linseed oil. Wall Nails are made in different lengths, and as they are usually sold by weight, the smaller sizes represent a much greater number in any given weight than the larger ones. Nail bags are very handy for holding a stock of shreds, &c., whilst nailing up trees or plants from a ladder. They are best made from leather in the shape of an open pocket, and held in position by a narrow belt and a shoulder strap. One or more upright sheaths or divisions are frequently made inside, in which the workman's knife and hammer may be placed when either are not in use. Canvas bags answer the purpose equally well when leather ones are not procurable.

NAMA (from *nama*, a stream of water; alluding to the natural place of growth). ORD. *Hydrophyllaceæ.* A genus comprising fifteen species of low, annual, perennial, or at length suffruticose, herbs, of which one is a native of the Sandwich Isles, and the rest are found in North-west America and Mexico, one of them extending in South America as far as Brazil. Flowers often blue, small or mediocre, solitary in the axils, sessile or shortly pedicellate, or irregularly cymose at the apices of the branches. Leaves alternate, petiolate, sessile or decurrent, entire. The species are not much grown. They thrive in sandy loam or in any ordinary good garden soil, and require a sheltered situation in summer, and protection throughout the winter. Propagation may be effected by divisions, or by cuttings, made in spring, and inserted in a close, warm frame or propagating house. *N. Parryi* is the best known member of the genus.

N. Parryi (Parry's). *fl.* lilac-purple, arranged in unilateral, dense, scorpioid clusters, on a terminal branched panicle; corolla about 1in. long. *l.* linear, repandly-toothed, villous, hirsute. Stems woody at base. *h.* 4ft. to 6ft. California, 1881. Half-hardy herbaceous perennial.

NANDINA (from Nandin, the vernacular name of the shrub in Japan). ORD. *Berberideæ.* A monotypic genus. The species is an erect, half-hardy or greenhouse, evergreen shrub, thriving in loam and sandy peat. It may be propagated by cuttings of ripened shoots, inserted in sand, under a handlight. Probably this plant would prove hardy in a sheltered place in the more southern counties.

N. domestica (domestic). *fl.* white, with yellow anthers, terminal, panicled. July. Berries about the size of peas. *l.* decompound; leaflets entire; petioles sheathing at the base. *h.* 5ft. China and Japan, 1804. This elegant plant varies a good deal in the size of the leaflets. (B. M. 1109.)

NANDIRHOBEÆ. Synonymous with *Cucurbitaceæ.*

NANNORHOPS (from *nannos*, dwarf, and *rhops*, a bush; in reference to the low growth of the plant). ORD. *Palmeæ.* A monotypic genus, the species being a low, gregarious, unarmed, stove palm, with a tufted, creeping caudex. It thrives in a compost of sandy loam, to which some leaf soil and a little charcoal may be added with advantage. Efficient drainage is an important essential. Propagated by seeds; also by offsets, when any can be procured and detached without injury to the parent plant.

N. Ritchieana (Ritchie's). *fl.* inclosed while in bud in the sheathing bracts; inflorescence erect, a slender compound panicle. *fr.* sub-globose or oblong, varying in size from ¼in. to ½in. in diameter. *l.* coriaceous, greyish-green; segments eight to fifteen, linear, rigid, 1ft. to 1¼ft. long, induplicate, deeply bipartite. *h.* 3ft. to 20ft. India, &c. The leaves, &c., of this plant are used in the manufacture of fans, sandals, baskets, brushes, &c.

NANODES (from *nanodes*, a pigmy; in reference to the small size of the plants). ORD. *Orchideæ*. A genus of cool orchids (now included, by Bentham and Hooker, under *Epidendrum*), distinguished in having the lip adnate to the column, and cohering with the lateral sepals, above which it is placed, and in the four compressed pollen-masses being sessile, side by side, on an ovate gland. They are natives of mountainous regions in South America. The species mentioned below thrive best in baskets of peat, fibre, and sphagnum, suspended near the glass.

N. discolor (discoloured). *fl.* purple, solitary, sessile, terminal, obscure, immersed between the leaves; sepals ascendent; petals declinate; lip fleshy, ovate, minutely crenulate. August. *l.* ovate-oblong, emarginate, amplexicaul, and sheathing at base, greenish-purple. Stems aggregate, 2in. to 3in. high, simple, densely leafy. Rio Janeiro. (B. R. 1541.)

N. Medusæ (Medusa's).* *fl.*, sepals and petals greenish, shaded with brown, large, terminal, produced two or more together; lip large and spreading, deeply fringed around the margin, rich maroon, with a green base. *l.* distichous, of a glaucous tint, curiously twisted, about 3in. long. Pseudo-bulb thick and fleshy, about 1ft. long. Andes. A rare and very curious plant. "Altogether, the flattened, stout culms, the pale glaucous colour of the foliage, and the extraordinary appearance and lurid purple of the flower, give it a most sinister appearance, and, for an orchid, a most unusual one" (Hooker). (B. M. 5723.)

NAPIFORM. Formed liked a turnip; having the figure of a depressed sphere.

NAPOLEONA (named after Napoleon Buonaparte). SYN. *Belvisia*. ORD. *Myrtaceæ*. A small genus (only two species) of glabrous stove trees, restricted to tropical Africa. Flowers various-coloured, solitary, in the axils of the leaves. Leaves alternate, entire, or obscurely sinuate-toothed, dotted. *N. imperialis* thrives in a compost of sandy peat and fibry loam. Propagated by cuttings of half-ripened shoots, 2in. to 4in. long, inserted in sand, under a hand glass, in mild bottom heat. The second species is probably not in cultivation. The species described below was discovered, towards the close of the eighteenth century, by Baron Palisot de Beauvois, and the badly-executed figure given by that author in his "Flore d'Oware et de Bénin," coupled with the singular structure and colour, caused some botanists for a considerable time to doubt the very existence of the plant. All uncertainty was, however, cleared away in 1843, when Whitfield, a botanical collector, brought with him to this country, from Sierra Leone, dried specimens and living plants of *Napoleona*; one of the latter flowering, some years later, in the garden of the then Duke of Northumberland.

N. imperialis (imperial). *fl.* apricot-colour and crimson, assuming a bluish tint when they decay; exterior of corolla large, concave-sub-hemispherical, many-folded and toothed; intermediate corona deeply cleft as far as the base into filiform, spreading laciniæ; central portion erect, cyathiform, with a much-cut, inflexed margin. May. *l.* shortly stalked, ovate-acuminate, dark green. *h.* 6ft. 1844. (B. M. 4387.)

NARAVELIA (from *Naravael*, the Cingalese name of the genus). ORD. *Ranunculaceæ*. A genus comprising only two (or perhaps three) species of stove climbing plants, with woody stems, natives of Southern Asia or the Indian Archipelago. Flowers paniculate; sepals four or five, petaloid, valvate; petals numerous, linear or clavate. Leaves opposite, bifoliolate; petioles produced into tendrils. *N. zeylanica*, probably the only species yet introduced, is an ornamental plant, with the habit of *Clematis*; it thrives in a compost of sandy peat and fibry loam. Propagated by cuttings of half-ripened shoots, inserted in sand, under a hand glass, in heat.

N. zeylanica (Cingalese). *fl.* yellow, with four or five sepals and six to twelve linear petals; panicle terminal, with trichotomous pedicels. *l.* opposite, stalked; leaflets two, ovate-acuminated, on very short stalks, five to seven-nerved, quite entire, or notched with one or two teeth on each side, velvety underneath, smooth above, drawn out at the apex into a trifid, twisted tendril. Ceylon, 1796.

NARCISSUS (the old Greek name used by Hippocrates, connected with a mythological story). Including *Ajax*, *Corbularia*, *Ganymedes*, and *Jonquilla*. ORD. *Amaryllideæ*. A genus of very popular, usually hardy, ornamental bulbous plants, of which probably not more than a score are entitled to specific rank. The genus is confined to Europe, North Africa, and North and West Asia. Flowers white or yellow, solitary or umbellate, drooping or inclined; spathe membranous; perianth tubular below, segments spreading, mouth surmounted by a circular corona or crown; stamens inserted in the tube, included within the crown; filaments free or adnate to the tube; scape compressed. Leaves linear (rush-like) or strap-shaped.

Mr. Baker's grouping of the species and varieties, and of the known or presumed hybrids, as published in the "Gardener's Chronicle," 1884, is given below, with a few varieties added. In Series I., the names printed in the first left-hand column, in small capitals, represent the sub-genera, those in the second, in italics, indicate the admitted species; the third column contains the sub-species, and the fourth the varieties as understood botanically. In Series II., the first column of names represents what are regarded as primary types; those in the second are regarded as secondary types.

Series I. Genuine Species and their Varieties.

MAGNICORONATI.

Crown, or trumpet, as long as, or rather longer than, the divisions of the perianth.

I. CORBULARIA—

N. Bulbocodium
- citrinus
- conspicuus
- tenuifolius
- Graellsii
- monophyllus
- nivalis

II. AJAX—

N. Pseudo-Narcissus
- Pseudo-Narcissus proper { the Wild Daffodil of England
- abscissus (muticus)
- cambricus
- lobularis
- princeps
- Telamonius
- variiformis

  { connecting links between Pseudo-Narcissus and major
- bicolor
- lorifolius
- rugilobus

  { connecting links between Pseudo-Narcissus and bicolor
- major
- maximus
- obvallaris
- pallidus præcox
- propinquus
- spurius
- minor
- minimus
- nanus
- pumilus
- moschatus
- albicans
- cernuus
- tortuosus

MEDIOCORONATI.

Crown, or cup, half as long as the divisions of the perianth, but, in one or two cases, three-quarters as long.

III. GANYMEDES—

N. calathinus
N. triandrus
- cernuus
- concolor
- nutans
- pulchellus

IV. QUELTIA—

N. incomparabilis
- albidus
- aurantius

N. odorus (calathinus, Hort.)
- lætus
- minor (pseudo-juncifolius)
- rugulosus

N. juncifolius
- apodanthus
- rupicolus

Narcissus—*continued.*

PARVICORONATI.

Crown less than half as long as the divisions of the perianth.

V. HERMIONE—
N. Jonquilla
N. Tazetta
aureus
canariensis
chrysanthus
Bertolonii
dubius
intermedius
bicrenatus
bifrons
primulinus
radiatus
italicus
Luna
Barlæ
mediterraneus
ganymedoides
ochroleucus
orientalis
pachybulbus
Panizzianus
papyraceus (unicolor, niveus)
polyanthos
N. viridiflorus, *N. serotinus*, elegans, obsoletus } autumn flowerers

VI. EUNARCISSUS—
N. poeticus
majalis
patellaris
poetarum
recurvus
stellaris
radiiflorus (angustifolius, Ait.)
verbanensis

VII. AURELIA—
N. Broussonetii

[Five of the preceding thirteen species are, practically speaking, out of court as garden plants.]

Series II. Hybrids, Known or Presumed.

MEDIOCORONATI.

1. *Humei* (Hume's hybrid): incomparabilis × Pseudo-Narcissus
albidus
concolor
2. *Backhousei* (Backhouse's hybrid)
3. *Macleai* (MacLeay's hybrid): Pseudo-Narcissus × Tazetta
Bernardi
Nelsoni
Sabini
tridymus
4. *Leedsii* (Leeds' hybrid): montanus × Pseudo-Narcissus
5. *Barrii* (Barr's hybrid): poeticus × Pseudo-Narcissus
6. *poculiformis*=montanus (Salisbury's hybrid):? papyraceus × moschatus
Dr. Masters
galanthifolius

PARVICORONATI.

7. *gracilis*: juncifolius × Tazetta
tenuior
8. *Burbidgei* (Burbidge's hybrid): superpoeticus × Pseudo-Narcissus
9. *biflorus*:? poeticus × Tazetta
albus

[Nos. 3, 6, 7, 9, are old, the others recent.]

Culture. The numerous and very beautiful species and varieties of Narcissus are amongst the most popular and largely cultivated of spring-flowering bulbs. The majority are extremely accommodating, as they thrive in almost any soil and situation, and may be left alone for several years after once being planted. A rather deep and somewhat stiff soil is, however, that in which the bulbs succeed best; and if the position is one partially shaded from hot sunshine in spring, the flowers of some of the species retain their beauty for a much longer period than they would if exposed to all the light and sunshine possible. Narcissi are well adapted for planting by the sides of lakes or ponds and in mixed flower or shrubbery borders. They are also suitable for naturalising in any quantity, in the grass, by the sides of woodland walks, in open spaces between trees or shrubs, and in any other position where the flowers may be readily seen on their appearance in spring. The foliage should not be cut off when green, but allowed to die naturally each year, and then be removed. Transplanting, or any division of the bulbs, is best performed during the months of July and August—the season when, according to Mr. Burbidge, they are usually dormant, and quite free from roots. Mr. Barr's experience is that new roots are made simultaneously with the dying of the old ones, and this in July or August. If this operation be deferred until later in autumn, more or less injury or check to the new growth must take place. The usual mode of propagation is by offsets, which should be collected from the parent bulbs, and planted out separately, for a year, in order that they may grow sufficiently large for flowering. The majority of the species increase somewhat freely by this method, and permanent clumps or collections may be lifted at the season above named, and their offsets removed, should there be a danger of injury, caused by the flowering bulbs being overcrowded, arising from their multiplying. The process of raising plants from seed is a slow one, but still it may be practised with a view to obtaining new varieties. Seeds should be sown, soon after being collected, in pans of sandy and rather loamy soil. Young bulbs should be planted in a prepared border; a two-year-old bulb would not be much thicker than a corn straw, and would not want more than ½in. or 1in. space; afterwards, when it becomes necessary, more room should be allowed. Seedling bulbs are not usually at their best the first year of flowering; consequently, their merits should not be too hastily judged. An annual top-dressing of loam and decayed manure may be applied with material advantage to all Narcissi when the dead foliage is removed.

Pot Culture, Forcing, &c. Varieties of Polyanthus Narcissi are very extensively cultivated in pots for greenhouse decoration, and for the use of their highly fragrant flowers in a cut state. Every sort that can be obtained, either with single or double flowers, is well worth growing in pots, and all are suitable for planting outside as well. Early Paper White and Double Roman are two excellent forcing varieties, which may be had in flower from November onwards, till spring, by potting successionally, and forcing very gradually.

FIG. 630. NARCISSUS BIFLORUS, showing Habit and detached Flowers.

Double and single sweet-scented Jonquils (*N. Jonquilla*) are very fragrant when in flower, and are well adapted for pot culture, as are also *N. poeticus*, and its finely-formed variety, *ornatus*. The Hoop Petticoat Narcissus (*N. Bulbocodium*) thrives admirably in 5in. pots, with three to six bulbs in each, or in small pans, if kept in a cold frame, in winter, and allowed to grow and flower without artificial heat. The varieties of the sections *Ajax* and *Queltia*, and, indeed, all Narcissi, are now being largely grown in pots. The *Triandrus* varieties, grown in pots,

Narcissus—*continued.*

are perfect gems. All the above-named succeed in the same sort of soil and under similar treatment to that given to Hyacinth bulbs (*see* **Hyacinthus**). The Paper White and Double Roman varieties may be forwarded, in heat, when their flower scapes can be seen; all the others are best if grown throughout in a cool frame.

FIG. 631. NARCISSUS BULBOCODIUM.

N. abscissus (cut off). A form of *N. Pseudo-Narcissus.*

N. albicans (whitish). A form of *N. Pseudo-Narcissus moschatus.*

N. albus (white). A form of *N. biflorus.*

N. angustifolius (narrow-leaved). A synonym of *N. poeticus radiiflorus.*

N. Barlæ (Barla's). A form of *N. Tazetta Luna.*

N. Bertolonii (Bertoloni's). A form of *N. Tazetta chrysanthus.*

N. bicrenatus (twice-crenate). A form of *N. Tazetta intermedius.*

Narcissus—*continued.*

N. biflorus (two-flowered).* *fl.* from fifteen to eighteen lines across when expanded; tube about 1in. long, exclusive of the ovary; divisions milk-white, spreading horizontally when expanded, ⅜in. to ½in. long, ⅛in. to ¾in. broad, obovate, much imbricated, blunt or cuspidate; crown one to one and a-half lines deep, less spreading than its close ally, *N. poeticus*, yellow, about ¼in. across, the edge conspicuously crispato-crenulate: scape with two salient edges, bearing typically two, rarely one or three, flowers. May. *l.* about four to a scape, ⅛in. to ¼in. broad, slightly glaucous, flattish, bluntly keeled, often more than 1ft. long. Bulb ovoid, more than 1in. thick. Europe (naturalised in Britain). Supposed to be a hybrid between *N. poeticus* and *N. Tazetta.* See Fig. 630. (B. M. 197; N. 41.) *albus* is a white-flowered form.

N. bifrons (two-faced). A form of *N. Tazetta intermedius.*

N. Broussonetii (Broussonet's). *fl.* greenish at the base, white upwards, with the tube eight or nine lines long, exclusive of the ovary, under one line thick; divisions of the limb sub-campanulately erecto-patent, pure white, oblong-lanceolate, about ½in. long by ¼in. broad, narrowed suddenly to a bluntish point; crown almost entirely confluent with the apex of the tube; scape about 1ft. high, from four to eight-flowered. Spring. *l.* about four to a scape, four to six lines broad, usually equalling the scape. Bulb ovoid, as large as a hen's egg. Mogadore. (N. 47.)

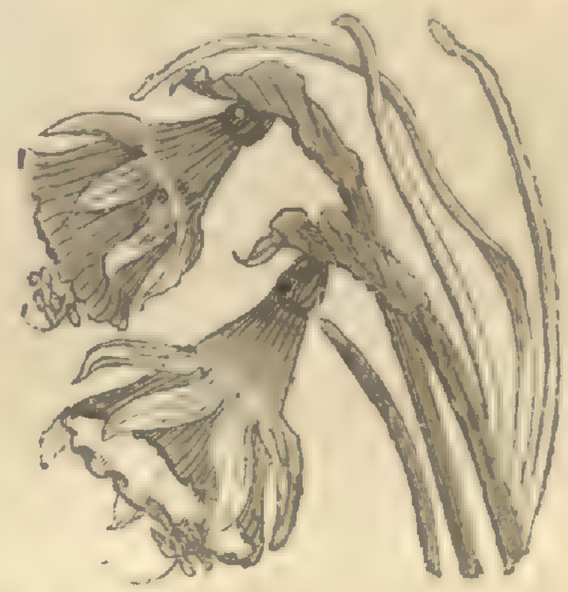

FIG. 632. NARCISSUS BULBOCODIUM CONSPICUUS.

N. Bulbocodium (Bulbocodium).* Hoop Petticoat. *fl.* bright yellow; perianth gradually widened from the ovary to the mouth of the crown, eighteen to twenty-one lines deep, exclusive of the ovary; tube and crown very nearly equal in depth, the latter scarcely at all crisped, and very indistinctly toothed at the throat; divisions of the limb ascending, linear, from one to three lines broad at the base, narrowed gradually from the base to an acute point; scape 4in. to 8in. high, slender, terete, one-flowered, flower either ascending or horizontal. April and May. *l.* two or

FIG. 633. NARCISSUS BULBOCODIUM MONOPHYLLUS.

Narcissus—*continued.*

three to a scape, sub-terete, 4in. to 8in. long, not more than one line broad. Bulb ovoid, ½in. to ¾in. thick. South-west Europe, North Africa, &c., 1629. See Fig. 631. (N. 1.)

N. B. citrinus (citron). This only differs from the type in its somewhat larger beautiful sulphur-yellow flowers.

N. B. conspicuus (conspicuous). A robust form, with a slightly expanded corona and exserted style. SYN. *N. conspicuus.* See Fig. 632. (S. B. F. G. ser. ii. 326.)

N. B. Graellsii (Graells'). *fl.*, perianth 1in. long, above the ovary; divisions sub-patent, with a brown keel, which is decurrent to the base of the tube; scape 4in. to 6in. long. *l.* two or three. (B. M. 6473B, under name of *N. Graellsii.*)

N. B. monophyllus (one-leaved).* *fl.*, perianth and corona nearly white; style exserted. *l.* very slender, usually solitary. Algeria. See Fig. 633. (B. M. 5831; N. 33B.)

N. B. nivalis (snowy). *fl.*, perianth not more than eight to nine lines long above the ovary; divisions of the limb as long as the corona; scape 2in. to 4in. high. *l.* two or three.

N. B. tenuifolius (slender-leaved). A slender form, with erect, shining leaves, a distinctly exserted style, and a distinctly lobed corona. (S. B. F. G. 114.)

FIG. 634. NARCISSUS CALATHINUS, showing Habit and detached Flower.

N. calathinus (cup-like).* *fl.* fourteen to fifteen lines long, exclusive of the ovary; tube ½in. long, less than one line thick in the lower half, the same colour as the rest of the flower; divisions of the limb oblong-lanceolate, bluntish or sub-acute, four to four and a-half lines broad at the base, decidedly reflexed when the flower is fully expanded, white, or a very pale sulphur-yellow; crown the same colour as the divisions, and the same length; throat erecto-patent, scarcely at all plicate, with six shallow, rounded, sub-entire lobes; scape 8in. to 12in. high, very slender, terete, one or two flowers to a stem, on pedicels nine to fifteen lines long. *l.* generally two to a scape, very slender, green, one and a-half to two lines broad, concave. Bulb ovoid, not more than ½in. thick. Brittany. See Fig. 634. (N. 14.) The name *reflexus* has been indiscriminately applied to both this species and *N. triandrus*; the latter has always the perianth longer than the cup, whilst in *calathinus* the perianth and cup are equal in length.

N. cambricus (Cambrian). A form of *N. Pseudo-Narcissus.*

N. cernuus (drooping). A form of *N. Pseudo-Narcissus moschatus.*

N. conspicuus (conspicuous). A synonym of *N. Bulbocodium conspicuus.*

N. Cypri (Cyprian). A synonym of *N. Tazetta.*

N. deficiens (deficient). A synonym of *N. serotinus.*

N. dubius (doubtful). A synonym of *N. Tazetta dubius.*

N. Gouani (Gouan's). A synonym of *N. incomparabilis.*

N. gracilis (slender). *fl.* pale sulphur-yellow, 1½in. to 2in. broad when expanded, usually one or two, rarely three; tube twelve to fourteen lines long, exclusive of the ovary, about one line thick; divisions obovate-cuspidate, spreading horizontally, ¾in. to ½in. broad; crown two to two and a-half lines deep, cup-shaped, ¾in. broad at the mouth, slightly plicate and crenulate, uniform in texture, a rather deeper yellow than the divisions; scape slightly compressed and two-edged, 1ft. high. April. *l.* four to six to a scape, very convex on the back, not more than three lines broad. Bulb ovoid, 1in. or more thick. Native country unknown. A hybrid between *N. juncifolius* and *N. Tazetta.* (B. R. 816.) SYN. *N. tenuior* (B. M. 379; N. 37).

N. Graellsii (Graells'). A synonym of *N. Bulbocodium Graellsii.*

N. incomparabilis (incomparable).* *fl.* always solitary, 2½in. to 2¾in. broad when expanded; tube nearly or quite 1in. deep, cylindrical, one and a-half to two lines thick at the middle, three lines at the throat; divisions spreading, slightly imbricated, 1in. long, generally a rather paler yellow than the crown, oblong-lanceolate, six to eight lines broad; crown six to seven lines deep, orange-yellow, nearly erect, much plaited at the throat, and furnished with six deep imbricated lobes, the mouth eight to

Narcissus—*continued.*

nine lines across. March and April. *l.* three or four to a scape, about 1ft. long, bluntly keeled, about ½in. broad, slightly glaucous. Bulb ovoid, 1in. to 1½in. thick. Europe, &c. (naturalised in Britain), 1629. (B. M. 121; N. 18-21.)

FIG. 635. NARCISSUS INCOMPARABILIS ALBIDUS PLENUS, showing Habit and detached Flower.

N. i. albidus (white). *fl.*, crown yellow, but the divisions a very pale sulphur-yellow or milk-white. The double form is the Orange Phœnix of gardens. See Fig. 635.

FIG. 636. NARCISSUS INCOMPARABILIS AURANTIUS.

N. i. aurantius (orange).* A robust form, with the crown orange, but the divisions a pale (sulphur) yellow. SYNS. *N. aurantius, N. Gouani.* See Fig. 636. Double forms of this are the Butter-and-Eggs and Nonpareil of gardens, which sometimes produce flowers 3in. across. See Fig. 637.

N. intermedius (intermediate). A synonym of *N. Tazetta intermedius.*

N. italicus (Italian). A synonym of *N. Tazetta italicus.*

N. Jonquilla.* Jonquil. *fl.* bright yellow, very fragrant; tube ten to eleven lines long, exclusive of the ovary; divisions of the limb spreading horizontally when fully expanded, ¾in. to ½in. long, slightly imbricated, oblanceolate or obovate-cuspidate; crown saucer-shaped, not more than one line deep, the edge faintly

Narcissus—*continued.*

FIG. 637. NARCISSUS INCOMPARABILIS AURANTIUS FLORE-PLENUS.

crenulate, about ⅜in. across; scape equalling or shorter than the leaves, slender, sub-terete, two to six-flowered. April. *l.* one or two to a scape, 8in. to 12in. long, semi-cylindrical, channelled

FIG. 638. NARCISSUS JONQUILLA, showing Habit, detached Flower, and Portion of Leaf

down to face. Bulb ovoid, under 1in. thick. Spain, &c., 1596. See Fig. 638. (B. M. 15; N. 40.) A double form of this species is known as Queen Anne's Jonquil.

N. juncifolius (Rush-leaved). *fl.* one or two, rarely three, nearly sessile in the spathes, or elevated on pedicels ⅛in. to 1in. long, tube seven to nine lines long, very slender, cylindrical, scarcely more than half a line thick; divisions bright yellow, patent, obovate, ⅜in. to ½in. long, ¼in. broad, cuspidate, decidedly imbricated; crown same colour as the divisions, obconical, faintly crenulate, two and a-half to three lines deep, four and a-half to five lines in diameter at the mouth; scape scarcely exceeding the leaves, very slender, and not at all two-edged. April. *l.* three or four to a scape, quite cylindrical, and rush-like in shape, 4in. to 6in. long. Bulb ovoid, about ½in. thick. Spain and South France. (N. 27.)

N. j. apodanthus (stalkless-flowered). *fl.*, corona deeply six-lobed. *l.* rather glaucescent.

N. j. rupicolus (rock-loving). *fl.*, corona orange-yellow, cup-shaped, less than half as long as the perianth segments. (B. M. 6473c, under name of *N. rupicola*.)

N. lobularis (small-lobed). A form of *N. Pseudo-Narcissus*.

N. lorifolius (strap-leaved). A form of *N. Pseudo-Narcissus bicolor*.

N. Macleai (MacLeay's).* *fl.* ascending as in the Daffodil, fifteen to sixteen lines deep, exclusive of the ovary: tube cylindrical, seven to eight lines long, ⅛in. thick, white, tinged downwards with green; divisions milk-white, spreading at a right angle from the base of the crown, oblong-lanceolate, much-imbricated, eight to nine lines long, four and a-half to six lines broad, bluntish or sub-acute; crown five to six lines deep, bright yellow, very slightly plicate, ½in. broad at the mouth, slightly lobed; scape about 1ft. high, sub-compressed and slightly two-edged, one or rarely two-flowered. April. *l.* five or six to a scape, 8in. to 10in. high, ½in. broad, concave on the face. Bulb 1in. or more thick. Native

Narcissus—*continued.*

FIG. 639. NARCISSUS MACLEAI.

country uncertain. A hybrid between *N. Pseudo-Narcissus* and *N. Tazetta*. See Fig. 639. (B. M. 2588; B. R. 987; N. 17.)

N. maximus (greatest). A form of *N. Pseudo-Narcissus major*.

N. minimus (smallest). A form of *N. Pseudo-Narcissus minor*.

N. montanus (mountain). A synonym of *N. poculiformis*.

N. nanus (dwarf). A form of *N. Pseudo-Narcissus minor*.

N. obsoletus (obsolete). A form of *N. serotinus elegans*.

N. obvallaris (trenched-round). A form of *N. Pseudo-Narcissus major*.

FIG. 640. NARCISSUS ODORUS.

N. odorus (fragrant). *fl.* slightly fragrant, horizontal or ascending; perianth bright yellow, fifteen to twenty-one lines deep, exclusive of the ovary; tube six to nine lines long, ⅛in. thick in the lower part, but wider at the throat; divisions nine to twelve lines

Narcissus—*continued.*

long, oblong-lanceolate, acute, very slightly paler than the corona, a fresh bright yellow, five to eight lines broad in the middle, usually imbricated for the lower half or third; crown five or six lines deep, plaited; throat sub-erect, more or less distinctly six-lobed, about ½in. across; scape 12in. to 15in. high, scarcely at all compressed or two-edged, generally two-flowered. April. *l.* three or four to a scape, nearly 1ft. long, two and a-half to three lines broad, very concave on the face, and convex on the back. Bulb ovoid, twelve to fifteen lines thick. Spain. See Fig. 640. (N. 23.) This species has several names, which are now all but obsolete (figured as *N. calathinus* in B. M. 934).

N. o. lætus (joyful). *fl.* smaller, and divisions shorter and blunter than in the type, scarcely more than half as long again as the crown. (B. M. 78, under name of *N. odorus*.)

N. o. minor (lesser). *fl.*, perianth and cup full yellow. A dwarf form. SYN. *N. pseudo-juncifolius*.

N. o. rugulosus (slightly wrinkled). *fl.*, perianth broad, imbricated; cup full yellow.

N. orientalis (Eastern). A synonym of *N. Tazetta orientalis*.

N. pachybulbus (thick-bulbed). A synonym of *N. Tazetta pachybulbus*.

N. pallidulus (palish). A synonym of *N. triandrus*.

N. pallidus præcox (palish, early). A form of *N. Pseudo-Narcissus major*.

N. papyraceus (paper). A synonym of *N. Tazetta papyraceus*.

FIG. 641. NARCISSUS POCULIFORMIS.

N. poculiformis (cup-like). *fl.* pure white, cernuous, odorous, eighteen to twenty-one lines long above the ovary; tube cylindrical, shorter than the divisions, line thicker in the lower half; divisions 1in. long, oblong-lanceolate, acute, often slightly twisted, ⅛in. to ¼in. broad at the middle; crown same colour as the rest of the flower, ⅛in. deep, moderately plicate and crenulate at the throat; scape 1ft. high, with one or two flowers. April. *l.* four or five to a scape, flattish, about ¼in. broad. Bulb 1in. thick. Probably a hybrid between *N. Tazetta papyraceus* and *N. Pseudo-Narcissus moschatus*. SYN. *N. montanus* (B. R. 123). See Fig. 641. (N. 16.)

FIG. 642. NARCISSUS POETICUS, showing Habit and detached Flower.

N. poeticus.* Poet's Narcissus. *fl.* from 1¾in. to 2in. across when expanded, with a distinct and agreeable odour; tube white, about 1in. long above the ovary; divisions a pure snow-white, obovate, blunt, or cuspidate, slightly imbricated, ½in. to ¾in., or sometimes, in cultivation, even 1in. broad; crown one to one and a half lines deep, saucer-shaped, very much crisped, with a bright scarlet edge, the mouth four to five lines across; scape 1ft. or more high,

Narcissus—*continued.*

compressed, and two-edged, one, or very rarely two-flowered. April. *l.* three or four to a scape, flat, with a blunt keel, glaucescent, often 1ft. or more long, ⅜in. to ½in. broad. Bulb ovoid, about 1in. thick. South Europe. A well-known plant. See Fig. 642. The principal varieties are as follows:

N. p. majalis (May). *fl.*, divisions of the perianth pure white, well-formed and generally flat; cup edged with saffron.

N. p. patellaris (broad-petalled). *fl.*, perianth pure white, flat, finely formed; cup large, edged with saffron. *l.* erect.

N. p. poetarum (poet's). An early form, with the expanded flower 2½in., or even 3in. across, and much-imbricated divisions. It is sometimes known as *N. p. grandiflorus*.

N. p. radiiflorus (ray-flowered). A more slender plant than he type, with narrower leaves, and obovate divisions of the limb of the flower so much narrowed downwards that they are not at all imbricated in the expanded flower, and also more narrowed at the point; crown rather narrower, and, consequently more erect. Flowers at least a fortnight earlier than the type. SYN. *N. angustifolius*. (B. M. 193.)

N. p. recurvus (recurved). A late-flowering form, with weak recurved leaves, and the divisions of the limb reflexed and crisped towards the edge. (N. 42A; S. B. F. G. ser. ii 188, under name of *N. recurvus*.)

N. p. stellaris (star-shaped). A late-flowering form, with the divisions of the limb, as in the variety *radiiflorus*, narrowed at the base, and not imbricated. (N. 42C; S. B. F. G. ser. ii. 132, under name of *N. stellaris*.)

N. p. verbanensis (Lago Maggiore). A very slender, late variety, with oblanceolate much-reflexed divisions (eight to nine lines long), which are yellowish at the base.

N. primulinus (rather early). A form of *N. Tazetta intermedius*.

N. princeps (princely). A form of *N. Pseudo-Narcissus*.

N. propinquus (related). A form of *N. Pseudo-Narcissus major*.

N. pseudo-juncifolius (Rush-leaved). A synonym of *N. odorus minor*.

N. Pseudo-Narcissus (bastard Narcissus).* Daffodil. *fl.* solitary, nearly sessile; perianth eighteen to twenty lines long above the ovary, the obconical tube about ½in. deep; divisions of the limb more or less ascending, sulphur-yellow, paler than the crown, oblong-lanceolate, nine to ten lines long, five to six lines broad at the base; crown just equalling the divisions, but deeper and more orange-yellow in colour; the mouth about 1in. across, slightly plicate and inciso-crenate; scape about 1ft. high, with two prominent edges. Early in March. *l.* five or six to a scape, glaucous, erect, flattish upwards, equalling, or, rather, shorter than the scape at the time of flowering. Bulb ovoid, 1in. to 1½in. thick. Europe (Britain), &c. (N. 3.) Of this, the Daffodil, there are five well-marked varieties (N. 4-13), which were known to, and described and named by, Linnæus, and which keep up their characters well enough under cultivation to stand as species for garden purposes. *abscissus* (*muticus*) is a variable form, with sulphur perianth and rich yellow trumpet. *cambricus* has sulphur-white perianth and yellow trumpet. *lobularis*, a dwarf form, has pale sulphur perianth and yellow trumpet. *princeps* has a sulphur-white perianth and yellow trumpet; flower very large and showy. *Telamonius*, the finest of this sub-group, has large, spreading, light yellow perianth, with channelled divisions, and large, handsome, yellow trumpet. *variiformis*, perianth ranging from white to primrose; trumpet from sulphur to deep yellow, the brim elegantly recurved.

FIG. 643. NARCISSUS PSEUDO-NARCISSUS MAJOR OBVALLARIS.

N. P.-N. bicolor (two-coloured). Stature of the type, and the flower the same size, but the corona a full bright yellow, forming a conspicuous contrast with the very pale sulphur-yellow divisions

Narcissus—*continued.*

of the limb. This is also known as *Ajax bicolor*. (B. M. 1187; N. 6.) The form *lorifolius* has a decidedly six-angled cup. *rugilobus* has a primrose-coloured perianth and yellow cup.

N. P.-N. major (greater). Larger in all its parts than the type; the leaves six to eight lines broad, the flower 2in. to 2¼in. long above the ovary; the divisions of the limb twice as long as the broadly obconical tube, the same colour as the crown, which slightly exceeds them, and spreads much more at the throat. (B. M. 51; N. 4.) The following are sub-varieties: *maximus*, with a greenish-yellow perianth, the tube of which is very short (S. B. F. G. ser. ii. 286, under name of *N. maximus*). *obvallaris* (Tenby Daffodil), perianth lighter yellow than the trumpet: the flower is of medium size: a remarkable variety, distinct from all others (see Fig. 643; B. M. 1301, under name of *N. major*). *pallidus præcox*, variable in shade of colour and size of flower; perianth and trumpet sulphur-white; the earliest and most beautiful of all Daffodils; it is a native of the French side of

FIG. 644. NARCISSUS PSEUDO-NARCISSUS MAJOR PALLIDUS PRÆCOX.

the Pyrenees (see Fig. 644). *propinquus* differs from *major* principally in the bluer green of the foliage and larger size of the flower. *spurius* is a very distinct, almost self-yellow form, with broad, imbricated hooded perianth, lying forward on a large expanded trumpet.

N. P.-N. minor (smaller). Smaller in all its parts than the type; the whole plant when cultivated not above 6in. or 8in. high; the leaves ¼in. broad, often only 3in. or 4in. long; the flower 1in. to 4in. long, exclusive of the ovary; the crown the same colour as

FIG. 645. NARCISSUS PSEUDO-NARCISSUS MINOR MINIMUS.

the divisions, and slightly exceeding them; divisions ¼in. broad at the base. (N. 5.) Mr. Baker refers the following to this as sub-varieties: *minimus*, a very small form, shown at Fig. 645 (B. M. 6, under name of *N. minor*); *nanus*, with flowers

Narcissus—*continued.*

intermediate in size between those of *minor* and *minimus* (see Figs. 646 and 647); and *pumilus*, with perianth segments about the length of the crown (S. B. F. G. ser. ii. 143, under name of *Ajax pumilus*).

FIG. 646. NARCISSUS PSEUDO-NARCISSUS MINOR NANUS.

N. P.-N. moschatus (musky). *fl.* at first a very pale sulphur-yellow, finally nearly white, large or middle-sized, the divisions narrower and more lanceolate than in the type, the crown the

FIG. 647. NARCISSUS PSEUDO-NARCISSUS MINOR NANUS.

same colour as the rest of the flower, equalling or slightly exceeding the divisions (B. M. 1300; N. 7.) The following are simply pale-flowered forms of the common Daffodil: *albicans*

FIG. 648. NARCISSUS PSEUDO-NARCISSUS MOSCHATUS CERNUUS.

cernuus (see Fig. 648; S. B. F. G. ser. ii. 101), and *tortuosus* (B. M. 924, under name of *N. moschatus*).

Narcissus—*continued.*

N. pumilus (dwarf). A form of *N. Pseudo-Narcissus minor.*

N. radiatus (rayed). A form of *N. Tazetta intermedius.*

N. recurvus (recurved). A synonym of *N. poeticus recurvus.*

N. rugilobus (wrinkled-lobed). A form of *N. Pseudo-Narcissus bicolor.*

N. rupicola (rock-loving). A synonym of *N. juncifolius rupicolus.*

N. serotinus (late-flowering). *fl.* usually solitary, rarely two together; tube, segments, and crown like those of *N. elegans*; scape very slender, under 1ft. high. September. *l.* solitary or two together, filiform, sub-terete, usually not appearing till the scape dies down. Bulb sub-globose, six to nine lines thick. South Europe, North Africa, Asia Minor. (N. 46.) SYN. *N. deficiens* (B. R. xxxiii. 22).

N. s. elegans (elegant). *fl.* usually from two to four; tube seven to eight lines long, under one line thick, greenish-white; divisions of the limb pure white, linear, very acute, six to eight lines long; crown yellowish, saucer-shaped, under one line deep, entire, or slightly crenulate; scape slender, flaccid, 6in. to 12in. long. September and October. *l.* one, or rarely two, flattish, channelled, one line or less broad, equalling or exceeding the scape. Bulb roundish, 1in. or less thick. Italy, Sicily, Algiers. (N. 45.) *obsoletus* is another form of this rare species, in which the corona is very minute.

N. spurius (spurious). A form of *N. Pseudo-Narcissus major.*

N. stellaris (star-shaped). A synonym of *N. poeticus stellaris.*

FIG. 649. INFLORESCENCE AND PORTION OF LEAF OF NARCISSUS TAZETTA.

N. Tazetta (Tazetta).* Polyanthus Narcissus. *fl.* fragrant, from 1in. to 1¼in. across when expanded, usually four to eight; tube about ¾in. long above the ovary; divisions of the perianth white, rather shorter than the tube, the alternate ones frequently narrower, all much imbricated, bluntish or cuspidate, four to five lines broad, spreading horizontally when fully expanded, or slightly reflexed; crown uniform bright yellow, two and a-half to three lines deep, the edge sub-entire or slightly crenulate or lobed. March. *l.* four to six to a scape, glaucescent, flattish, bluntly keeled on the back. Bulb 1½in. to 2in. thick, copiously tunicated with brown membranous coats. Europe. See Fig. 649. A well-known and widely-distributed species. SYN. *N. Cypri.* (N. 29-34.)

N. T. aureus (golden). *fl.* when expanded 1in. to 1½in. across; divisions bright yellow, ½in. to ⅝in. long, four to five lines broad, bluntish, and much imbricated; crown sub-entire, about one-third the length of the divisions, a deep orange-yellow; tube exceeding the limb. (B. M. 925, under name of *N. Tazetta.*)

N. T. canariensis (Canary Islands). *fl.*, crown scarcely more than one line long; tube extremely slender, ¾in. long, swelling where it joins the limb; scape slender, bearing a seven-flowered umbel. *l.* scarcely more than ⅛in. wide.

N. T. chrysanthus (golden-flowered). *fl.* about 1in. across; divisions of the limb imbricated, narrowed to a point, lemon-yellow; crown sub-entire, golden-yellow, about two lines deep. scape six to ten-flowered. The form *Bertolonii* resembles *N. T. papyraceus*, but has smaller flowers and shorter perianth lobes.

N. T. dubius (doubtful). *fl.* two to six, six to nine lines across when expanded; tube cylindrical, pure white, five to six lines long, about one line thick; divisions pure white, ovate-oblong, three lines long, two and a-half lines broad, imbricated, patent or slightly reflexed, sub-obtuse or cuspidate; crown pure white, obconical, ¼in. deep, slightly crisped, and crenulate at the throat, which is not more than three lines across; scape 6in. to 9in. long, slender, decidedly compressed and two-edged. *l.* four to six to a scape, concave on the face, 5in. to 6in. long, one and a-half to three lines broad. Bulb ovoid, nine to twelve lines thick. South France, &c. (N. 28, and Fl. Ment. 71, under name of *N. dubius.*)

FIG. 650. NARCISSUS TAZETTA INTERMEDIUS.

N. T. intermedius (intermediate). *fl.* from twelve to fifteen lines across when expanded, the divisions obovate-cuspidate, lemon-yellow, five to seven lines long, four to four and a-half lines broad, much imbricated; crown two to two and a-half lines deep, slightly deeper in colour than the divisions, the edge a little plaited and crenulate; scape 1ft. or rather more high, sub-terete, from two to five-flowered. *l.* three or four to a scape, sub-cylindrical, from two and a-half to three lines broad. Bulb ovoid, 1in. or more thick. Spain, &c. See Fig. 650. (Fl. Ment. 41, under name of *N. intermedius.*) To this the following sub-varieties are referred by Mr. Baker: *bifrons*, with narrow lobes and a deep crown; *bicrenatus* and *primulinus*, with broader, much imbricated lobes, and a shallower, more open, crown; *radiatus*, with oblong-lanceolate, less imbricated divisions, and a six-lobed crown (N. 38).

N. T. italicus (Italian). *fl.*, scape slender, distinctly two-edged, producing from six to ten flowers, which are from 1½in. to 2in. across when expanded; divisions eight to ten lines long, about equalling the tube, narrowed gradually to a point, slightly imbricated, pale lemon-coloured; crown sulphur-yellow, two to two and a-half lines deep, distinctly six-lobed. SYN. *N. italicus.* (B. M. 1188.)

N. T. Luna (Luna). *fl.* fewer than in *N. T. papyraceus*, about 1in. broad when expanded, with oblong, much-imbricated lobes. *Barlæ* is a slight form from Italy.

N. T. mediterraneus (Mediterranean). This differs from the type by the narrower divisions of the flower, which are not more than ¼in. broad, not at all imbricated, and more lengthened out at the point. *ganymedoides* is a sub-variety with the divisions slightly reflexed.

N. T. ochroleucus (yellowish-white). *fl.* when expanded 1in. to 1½in. across; divisions milk-white, ¼in. broad, much imbricated; crown citron-yellow, with a sub-entire edge, nearly half as long as the divisions. *l.* greener, and more convex on the back, and stem more nearly terete than in the variety *polyanthos.* SYN. *Hermione tereticaulis.* (S. B. F. G. ser. ii. 179.)

Narcissus—*continued.*

N. T. orientalis (Oriental). This differs from the type in its crown, which is more manifestly trilobate, more crenulate, and patent. (B. M. 940, under name of *N. orientalis α.*)

N. T. pachybulbus (thick-bulbed). *fl.* pure white, six to seven lines across; tube ½in. long above the ovary, the segments of the limb not more than ¼in. long, roundish, much imbricated, cuspidate; crown not more than one line deep, sub-entire; scape under 1ft. high, compressed and ancipitous, five to eight-flowered. *l.* four or five to a scape, glaucescent, about ¼in. broad, flattish. Bulb ovoid, 2in. or more thick. Algeria. (N. 39, under name of *N. pachybulbus.*)

N. T. Panizzianus (Panizzi's). *fl.*, when expanded, nine to ten lines across; crown sub-entire, pure white. A small form, closely allied to the variety *papyraceus*, but more slender, and smaller in all its parts. (N. 36.)

N. T. papyraceus.* Paper-white Narcissus. *fl.* when expanded 1¼in. to 1½in. across; tube greenish-white, eight to nine lines long above the ovary; divisions pure white, three to four lines broad, generally narrowed gradually to a point, and moderately imbricated; crown two to two and a-half lines deep, with a crenulate edge. *l.* glaucescent, ½in. to ⅝in. broad. Stem ancipitous. SYN. *N. papyraceus.* (N. 35.)

N. T. polyanthos (many-flowered). *fl.* from eight to twenty, 1in. to 1¼in. across when fully expanded; divisions pure white, four or five lines broad, imbricated, bluntish or cuspidate, equalling or shorter than the tube; crown about one-third as long as the divisions, at first a very pale yellow, finally becoming nearly the same colour as the divisions, slightly plicate, the edge sub-entire.

N. Tazetta (Tazetta), of Gawler. A synonym of *N. T. aureus.*

N. Telamonius (Telamonius). A form of *N. Pseudo-Narcissus.*

N. tenuior (slenderer). A synonym of *N. gracilis.*

N. tortuosus (twisted). A form of *N. Pseudo-Narcissus moschatus.*

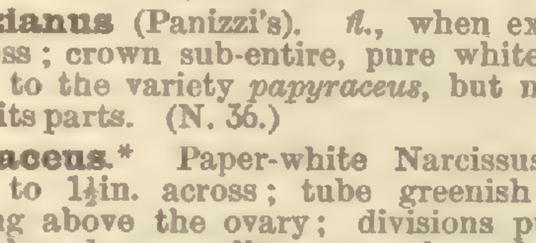

FIG. 651. NARCISSUS TRIANDRUS.

N. triandrus (three-stamened).* *fl.* horizontal or cernuous, measuring from nine to ten lines from the top of the ovary to the top of the crown; tube cylindrical, under half a line thick in the lower half, pure white, like the reflexed divisions of the limb, which just equal it in length, and are lanceolate, acute, one and a-half to two lines broad at the base; crown pure white, obconical, two and a-half to three lines deep, erecto-patent and entire at the throat; scape very slender, 6in. to 12in. long, one or two-flowered. April. *l.* very slender, semi-cylindrical, 6in. to 8in. long, three to four to a scape, under one line broad. Bulb not more than ½in. thick. Spain. SYN. *N. pallidulus.* See Fig. 651. (B. M. 6478; N. 15.) The following are some of the better-known varieties of this species:

N. t. cernuus (drooping). *fl.* one or two, pale yellow; crown a rather deeper yellow; both divisions and crown rather larger than in the type. SYN. *N. triandrus.* (B. M. 48.)

N. t. concolor (one-coloured). *fl.* two to four; divisions and crown pale yellow, the same size as in the type. SYN. *Ganymedes concolor.* (S. B. F. G. ser. ii. 113.)

N. t. luteus (yellow). A synonym of *N. t. pulchellus.*

N. t. nutans (nodding). *fl.* two or three; crown a deeper yellow than the divisions, crenulate. SYN. *N. trilobus.* (B. M. 945.)

N. t. pulchellus (pretty). *fl.* three to four; corona white; divisions bright yellow. SYNS. *N. t. luteus* (B. M. 1262) and *Ganymedes pulchellus* (S. B. F. G. ser. ii. 99).

N. triandrus (three-stamened), of Curtis. A synonym of *N. t. cernuus.*

N. trilobus (three-lobed). A synonym of *N. triandrus nutans.*

N. variiformis (variously-formed). A form of *N. Pseudo-Narcissus.*

N. viridiflorus (green-flowered). *fl.* with a Jonquil-like odour; tube seven to eight lines long; divisions slightly shorter, greenish, linear, very acute, spreading horizontally, not more than one line broad in the lower part; crown very minute, with six roundish, sub-marginate lobes; scape slender, one to four-flowered. Autumn. *l.* solitary or in twos, slender, terete, fistulose, about 1ft. long. Bulb small, globose. Spain, 1629. (B. M. 1687; N. 44.)

Garden Varieties. Very few of the numerous varieties of *Narcissus* may be considered unworthy of cultivation. Many of the Narcissi may be employed for naturalising, and for shrubbery border decoration, when they can be procured in quantity at a cheap rate. Subjoined is a list of the best varieties, selected from the different groups and divisions that have been arranged. We are indebted to Mr. Peter Barr for the illustrations here given, as well as for several of those used in the species.

Group I. Magnicoronati (*Ajax, or Pseudo-Narcissus*).

TRUMPET DAFFODILS—GOLDEN.

Blondin. Perianth yellow, and channelled; trumpet full yellow, and large.

Captain Nelson. Perianth rich yellow, and very large; trumpet long, broad, and spreading.

Edith Barber. Perianth full primrose; trumpet yellow. A dwarf grower.

Emperor. Perianth deep primrose; trumpet rich full yellow. Very large flower.

Hudibras. Perianth yellow, broad, imbricated, and longer than the deep yellow trumpet. Very distinct.

J. G. Baker (*volutus*). Perianth and trumpet rich primrose. A very distinct variety.

John Nelson. Flower of an almost uniform yellow, drooping, large, rounded. Very distinct.

Major superbus. Perianth broad and firmly set; trumpet large, and gracefully flanged. This is one of the most distinct of Mr. Leeds' yellow Daffodils.

M. J. Berkeley. Flower of a uniform rich deep yellow. The largest of all yellow trumpet Daffodils.

Randolph Churchill. Perianth long, and elegantly twisted; trumpet full yellow, long, narrow, and elegantly lobed.

Shirley Hibberd. Trumpet deep yellow, large, expanded, with lighter yellow divisions of perianth slightly twisted. Distinct.

Spurius coronatus. This is remarkable for its large, broad, expanded yellow trumpet, and lighter yellow spreading divisions of perianth.

Thomas Moore. Perianth light yellow; trumpet long, narrow, regularly lobed, rich, full yellow. Distinct.

TRUMPET DAFFODILS—TWO-COLOURED.

Dean Herbert. Perianth full primrose, changing to sulphur; trumpet rich yellow. Very large.

Empress. Perianth white, and of great substance; trumpet rich yellow. A very large flower.

Grandis. Perianth pure white, large, and finely imbricated; trumpet full yellow, very large. The finest of the Bicolor varieties.

Horsfieldii. Perianth white; trumpet rich yellow. Very large flower.

James Walker. Perianth sulphur-white, elegantly imbricated; trumpet large, handsome.

J. B. M. Camm. Perianth white and very graceful; trumpet primrose, elegantly formed. Distinct.

Michael Foster. Perianth sulphur-white, large; trumpet rich yellow, large, thick. Very distinct.

Mrs. J. B. M. Camm. Perianth white, elegant; trumpet sulphur-white. Very graceful and distinct.

Nobilis. Perianth white, shading to primrose; trumpet orange-yellow, broadly expanded at brim, fringed and lobed.

TRUMPET DAFFODILS—WHITE OR WHITISH.

Cernuus pulcher. Perianth silver-white; trumpet primrose, passing to white, large, bold, spreading.

Colleen Bawn. Perianth pure white, broad, and twisted; trumpet pale sulphur, passing to white.

C. W. Cowan (*Cowani*). Perianth white; trumpet sulphur. Very distinct and elegant.

Dr. Hogg. Perianth white; trumpet primrose, passing to white, long, smooth at brim, elegantly recurved.

Exquisite. Perianth sulphur-white; trumpet primrose, passing to white. Early, and very distinct.

F. W. Burbidge. Perianth white; trumpet sulphur, passing to white, long-ribbed, and elegantly gashed. Very distinct.

Gertrude Jekyll. Perianth and trumpet almost uniform sulphur. Very distinct.

Mrs. F. W. Burbidge. Perianth white; trumpet primrose, passing to snow-white, straight, in the way of F. W. Burbidge and flowers same time.

Narcissus—*continued.*

Rebecca Syme (the Violet-scented Daffodil). Perianth white; trumpet citron. This variety is as remarkable for its refined beauty as for its exceptional Violet fragrance.

St. Bridgid. Perianth pale sulphur-yellow; trumpet canary. A large and very handsome flower.

Sir Stafford Northcote. Perianth white; trumpet pale sulphur, long. Very distinct.

Tortuosus (the Great Tortuose White Spanish Daffodil). Perianth pure white, usually twisted, and somewhat shorter than the trumpet, which is pale sulphur, changing to snow-white.

William Goldring. Perianth snow-white, long, dog-eared, completely enveloping the primrose trumpet. The arching of the stem, and drooping of the flower, fairly entitle this variety to the name "Swan's Neck Daffodil."

W. P. Milner. Perianth and trumpet sulphur. Small, neat flower; very distinct.

TRUMPET DAFFODILS—DOUBLE.

Capax plenus (Queen Anne's Double Daffodil). Flowers of a pale lemon colour, very handsome.

Cernuus flore elegantissimo pleno (The Double White Trumpet Daffodil).

Grandiplenus (The Dwarf Double Light Yellow). This flower spreads to a large size when fully open, and a fine specimen will show as many as ten or twelve centres, from which petaloid bodies radiate, thus having the appearance of ten or twelve small Narcissi bound together.

Nanus plenus. This is supposed to have been raised from seed by Dr. Brown, of Hull.

Plenissimus (John Tradescant's Great Rose Daffodil).

FIG. 652. NARCISSUS PSEUDO-NARCISSUS PLENUS, showing Habit and detached Flower.

Pseudo-Narcissus plenus (The Double Lent Lily, or Gerard's White and Yellow Double Daffodil). See Fig. 652.

Telamonius plenus (Wilmer's Great Double Golden-yellow Daffodil).

Group II. Mediocoronati.

INCOMPARABILIS (NONSUCH YELLOW DAFFODILS, WITH CHALICE-SHAPED CUP).

Autocrat. Perianth yellow; cup yellow, and much expanded.

Beauty. Perianth sulphur, barred yellow; cup margined orange, large. Remarkably large distinct flower.

C. J. Backhouse. Perianth yellow, medium size; cup rich orange-scarlet, very large and long. The most remarkable and attractive of the yellow forms of *incomparabilis*.

Concolor. Perianth yellow; cup yellow.

Darling (*marginatus*). Perianth sulphur; cup yellow, edged orange.

Edward Hart. Perianth and cup full yellow. Very distinct.

Figaro. Perianth yellow; cup stained orange-scarlet, large and spreading. Large flower.

Frank Miles. Perianth yellow; cup large and neat. Very large and remarkable.

Gloria Mundi. Perianth medium size; cup heavily stained bright orange-scarlet, large, and very much expanded.

Hogarth. Perianth primrose; cup yellow, large, and spreading. Very distinct.

John Bull. Perianth sulphur; cup large and spreading. Large flower.

King of the Netherlands. Perianth sulphur; cup stained orange, very large, spreading. Very distinct and beautiful.

Leedsii. Perianth yellow; cup heavily stained with orange-scarlet.

Narcissus—*continued.*

Longshanks. Perianth sulphur; cup large. Plant tall.

Magog. Perianth sulphur; cup large. Fine large flower.

Mrs. A. F. Barron. Perianth yellow; cup margined with bright orange-scarlet, straight and narrow. Flower small, and very neat.

Queen Sophia. Perianth sulphur; cup heavily stained orange-scarlet, very large, spreading, and frilled. Very distinct.

Sir Watkin. Perianth rich sulphur; cup yellow, tinged with orange. The largest in the section.

Sulphureus. Perianth sulphur; cup yellow.

Titian. Perianth yellow; cup margined orange. Flower large.

INCOMPARABILIS (PEERLESS, WHITE OR WHITISH DAFFODILS).

Albert Victor. Perianth sulphur-white, large; cup large, and elegantly expanded. Very distinct.

Albidus. Perianth sulphur-white; cup yellow.

Albus. Perianth white; cup yellow.

Annie Baden. Perianth sulphur-white; border of cup elegantly contracted and stained orange.

Bertie. Perianth sulphur-white, broad; cup yellow, edged orange. A beautiful plant.

Cynosure. Perianth primrose, changing to white, large; cup conspicuously stained orange-scarlet, large. Remarkably showy.

Fair Helen. Perianth creamy-white and well-formed; cup elegantly edged with orange, straight.

Gog. Perianth creamy-white, large; cup yellow, large.

Goliath. Perianth white, barred yellow, large; cup yellow, large.

Harpur-Crewe. Perianth white; cup fine yellow.

Lorenzo. Perianth soft primrose, changing to white, slightly dog-eared; cup yellow. Very distinct.

Mary Anderson. Perianth pure white; cup bright orange-scarlet. Very distinct.

Mrs. Syme. Perianth sulphur-white, short; cup yellow, large, and spreading. Flower comparatively small. Plant tall, very distinct.

Princess Mary. Perianth creamy-white, broad, and well imbricated; cup suffused orange-scarlet, large, very much expanded, and perfectly smooth. Fine form.

Queen Bess. Perianth white, large; cup light yellow, large, much expanded. Very distinct.

Semi-partitus. Perianth pale primrose; cup sulphur, deeply and distinctly lobed. A remarkable flower.

Stella. Perianth white, large; cup yellow, fine.

BARRII (BARR'S YELLOW DAFFODILS, WITH SHORTENED CHALICE-SHAPED CUP).

Barrii. Perianth and cup yellow, going off primrose.

Conspicuus. Perianth yellow, going off sulphur, large, broad, spreading; cup conspicuously stained orange-scarlet, broad, short. A remarkable flower, of great beauty.

Golden Gem. Perianth rich full yellow, passing to primrose; cup yellow, edged orange.

Mimico. Perianth sulphur; cup yellow. Very fine.

Orphée. Perianth primrose, changing to sulphur; cup yellow, edged orange.

BARRII (BARR'S WHITE OR WHITISH DAFFODILS, WITH SHORTENED CHALICE-SHAPED CUP).

Ada. Perianth sulphury-white; cup yellow.

Albus. Perianth pure white; cup yellow, tinged orange.

Beatrice Murray. Perianth creamy-white; cup canary, elegantly edged with orange. Very distinct.

Flora Wilson. Perianth pure white, large; cup canary, strongly edged with scarlet.

General Murray. Perianth creamy-white, broad; cup canary, elegantly edged orange. Very distinct.

Maurice Vilmorin. Perianth creamy-white, broad; cup lemon, conspicuously stained with orange-scarlet. Very distinct.

Miriam Barton. Perianth primrose; cup canary, large.

Romeo (*primulinus*). Perianth creamy-white, dog-eared; cup canary. Very distinct.

S. A. de Graaf. Perianth white, finely formed; cup stained with orange-scarlet, spreading.

Sensation. Perianth pure white, large; cup canary, conspicuously edged orange-scarlet. Very striking flower.

William Ingram. Perianth white; cup primrose, conspicuously stained orange-scarlet, elegant.

Narcissus—*continued.*

LEEDSII (LEEDS' EUCHARIS-FLOWERED WHITE DAFFODILS, WITH WHITE OR PRIMROSE CHALICE-SHAPED CUP).

Acis. Perianth white; cup elegantly stained orange, changing to white.

Albion. Perianth white, large and starry; cup canary.

Amabilis. Perianth white, large, and spreading; cup passing from primrose to white, long and conspicuous.

Arsinoe. Perianth white; cup canary. Medium-sized flower.

FIG. 653. NARCISSUS LEEDSII BEATRICE.

Beatrice. Perianth white, fine form; cup changing from lemon to white, remarkably elegant. Of the white hybrids, this is the purest, and possesses the highest type of beauty. See Fig. 653.

Ceres. Perianth white, neat, and small; cup edged with orange.

Circe (*gloriosus*). Perianth white; cup changing from canary to white.

Duchess of Brabant. Perianth white; cup canary.

Duchess of Westminster. Perianth white, large; cup canary, tinged orange on first expanding, long. Distinct and very handsome.

Elegans. Perianth white, large, drooping, and somewhat shouldered; cup primrose, sometimes stained apricot, long. Very distinct.

Fanny Mason. Perianth white; cup canary. Medium-sized flower.

Flora. Perianth white; cup stained orange. On first opening, the flowers are drooping.

Gem. Perianth white, of model form; cup lemon, passing to white. Very distinct.

Grand Duchess. Perianth white, and starry; cup changing from stained orange to white, spreading.

Hon. Mrs. Barton. Perianth white, large, and broad; cup changing from primrose to white. A remarkable variety.

Ianthe (*Vincenti delicatus*). Perianth white; cup canary. Medium-sized flower.

Katherine Spurrell. Perianth white, broad, and overlapping; cup canary. Large flower; very distinct.

Leedsii. Perianth white, and somewhat starry; cup lemon, changing to white.

Madge Matthew. Perianth white, large; cup passing from canary to primrose, elegant.

Maria Magdaline de Graaff. Perianth white; cup suffused orange. Usually two-flowered. Very distinct in flower and foliage; the latter is broad and drooping.

Minnie Hume. Perianth white, large; cup changing from canary to white, large and spreading. A remarkable variety.

Mrs. Langtry. Perianth white, broad; cup white, large. A very distinct flower.

Palmerston. Perianth white; cup canary.

Princess of Wales. Perianth white, small, and neat; cup opening canary, changing to white, large and spreading. A gem.

Queen of England. Perianth white, large; cup canary, large, expanded, style of Minnie Hume.

Superbus. Perianth white, large, and dog-eared; cup passing from primrose to white.

HUMEI (HUME'S DOG-EARED DAFFODILS, WITH STRAIGHT CROWN).

Concolor. Perianth and trumpet uniform yellow. A very remarkable hybrid.

Giant. Perianth yellow, changing to sulphur; trumpet yellow. Flower very large, and of extraordinary character.

Sulphur. Perianth sulphury-white; trumpet yellow. A very distinct plant.

Narcissus—*continued.*

BACKHOUSEI (BACKHOUSE'S DAFFODILS, WITH COFFEE-CUP-SHAPED CROWN).

Backhousei. Cup yellow, long, nearly equalling the spreading sulphury perianth. Flowers horizontal, with distinct basal tube. Of bold habit.

William Wilks. Perianth primrose, spreading, closely imbricated; trumpet striking orange-yellow, frilled at the brim. Very distinct.

Wolley Dod. Perianth primrose, large, spreading; trumpet deep yellow, short. A very distinct, handsome Daffodil.

NELSONI (NELSON'S DAFFODILS, WITH GOBLET-SHAPED CROWN).

Aurantius. Perianth white, broad, flat, and spreading; cup suffused with orange-scarlet, ribbed, and expanding at the mouth.

Expansus. Perianth white, broad, flat, and spreading; cup yellow, and expanding.

Margaret Jones. Perianth sulphur-white, somewhat wavy; cup yellow. A hybrid of Mr. Leichtlin's (Empress × *Poeticus grandiflorus*).

Minor. Perianth white; cup yellow. Flower small, and comparatively dwarf; distinguished by pistil projecting beyond mouth of the cup.

Mrs. C. J. Backhouse. Perianth pure white, and broad; cup yellow, and very long.

Nelsoni. Perianth white, large; cup yellow, usually suffused orange on first opening, straight.

Pulchellus. Perianth white; cup yellow. Flower of somewhat drooping character on first opening; distinguished by the campanulate shape of the imbricated perianth.

Stanley. Perianth white, large, and rigid; cup yellow.

William Backhouse. Perianth white; cup yellow. Evidently the same cross as *Nelsoni major*, but with a pure yellow cup, thus showing that Mr. Leeds and Mr. Backhouse, in crossing, used similar flowers.

BERNARDI (BERNARD'S PYRENEAN DAFFODILS).

Bernardi. Perianth white; cup yellow. Sturdy foliage. The Hon. Mrs. Barton, Straffan House, county Kildare, collected this handsome hybrid a few miles from Luchon, on the Pyrenees, 1878, and it has been verified by Mr. Burbidge as the type Bernardi.

Fritton Decoy. Perianth white; cup yellow, edged with orange.

H. E. Buxton. Perianth white; cup suffused with orange-scarlet.

TRIDYMUS (TRIPLE-CROWN DAFFODILS).

A. Rawson. Flowers yellow, large, bold, well imbricated.

Duchess of Albany. Perianth sulphur; cup yellow.

Duke of Albany. Perianth sulphur; cup orange.

Grand Duke of Hesse. Perianth creamy-white; cup yellow.

Innocence. Perianth sulphur-white, small; cup yellow.

Princess Alice. Perianth creamy-white; cup orange.

S. A. de Graaff. Flowers bold yellow, changing to primrose, large, well imbricated; cup yellow.

Tridymus. Perianth and cup yellow. Plant somewhat recumbent.

THE DOUBLE-FLOWERED NONSUCH AND PEERLESS DAFFODILS (*Incomparabilis plenus*).

Albus plenus aurantius (Eggs and Bacon, Orange Phœnix). Double white, with orange nectary.

Albus plenus sulphureus (Codlings and Cream, Sulphur Phœnix). The Double White Peerless Daffodil, with sulphur nectary.

Aurantius plenus (Butter and Eggs, Golden Phœnix). Double yellow, orange nectary.

QUEEN ANNE'S DOUBLE JONQUIL.

Odorus minor plenus. Flowers of a rich full yellow, not unlike a small double yellow rose.

Group III. Parvicoronati.

BURBIDGEI (BURBIDGE'S POETICUS DAFFODILS, WITH SAUCER-SHAPED CUP).

Agnes Barr. Perianth creamy-white; cup yellow.

Baroness Heath. Perianth primrose, changing to white; cup suffused with orange, drooping. Foliage strong. Very distinct.

Beatrice Heseltine. Perianth creamy-white, passing to pure white; cup conspicuously edged with orange-scarlet, as in *conspicuus*.

Box. Perianth yellow; cup citron, and plaited.

Narcissus—*continued.*

FIG. 654. NARCISSUS BURBIDGEI.

Burbidgei. Perianth clear white; cup margined with cinnabar-red. Very early, and useful for cutting. See Fig. 654.

Conspicuus. Perianth sulphur-white, passing off white; cup conspicuously edged with orange-scarlet, and expanded.

Crown Prince. Perianth creamy-white, broad; cup canary, margined with orange. Foliage strong, erect.

Crown Princess. Perianth white; cup canary, margined with orange. Foliage strong, drooping. Very distinct.

Edith Bell. Perianth alabaster-white, changing to pure white; cup canary, margined with orange. Very distinct.

Ethel. Perianth primrose; cup yellow.

Falstaff. Perianth white; cup lemon.

Gracilis. Perianth sulphur-white; cup plaited and tinted with orange, spreading.

Guinever. Perianth white, compact; cup canary, frilled.

John Bain. Perianth large white; cup citron.

Little Dirk. Perianth passing from yellow to creamy-white, short, neat, compact; cup conspicuously edged orange-scarlet. The smallest of the group; very beautiful.

Little John. Perianth creamy-white, passing to white, compact; cup yellow, small, plaited.

Mary. Perianth white; cup suffused with orange, expanded.

Model. Perianth clear white, compact; cup stained with orange, frilled.

Ossian. Perianth white; cup yellow, large, broad expanding.

Primrose Star. Perianth primrose, neat; cup yellow.

Princess Louise. Perianth white, sharply pointed; cup tinged orange, expanded.

St. John's Beauty. Perianth white, large; cup lemon, tinged with orange.

Sulphur Star. Perianth sulphur-white; cup canary, edged with orange.

Thomas Moore Absolon. Perianth white; cup citron, elegantly expanded.

Vanessa. Perianth yellow, passing to primrose, neat, compact; cup yellow, expanded. A perfect flower.

POETICUS (THE PURPLE-RINGED POET'S DAFFODILS).

Marvel. Perianth pure white; cup margined with saffron. A small, bladder-like, distended spathe, about 1in. long, appears weeks before the flower, and out of this, in due course, emerges the blossom. Very beautiful, and distinct.

FIG. 655. NARCISSUS POETICUS ORNATUS.

Ornatus. Perianth pure white, broad, and well formed; cup margined with scarlet. Early and very fine; one of the best and most useful. See Fig. 655.

Narcissus—*continued.*

Tripodalis. Perianth pure white, reflexed; cup deeply margined scarlet.

POLYANTHUS NARCISSUS (THE BUNCH-FLOWERED DAFFODILS).

Apollo. Perianth primrose; cup deep yellow.

Bathurst. Perianth primrose; cup orange.

Bazelman Major. Perianth white, broad, large; cup stained orange.

Florence Nightingale. Perianth white; cup deep orange. Extra fine; dwarf.

Gloriosus. Perianth white; cup orange.

Grand Monarque. Perianth white, broad; cup yellow.

Grand Soleil d'Or. Perianth rich yellow; cup deep orange.

Her Majesty. Perianth white, broad; cup orange.

Jaune Supreme. Perianth primrose; cup orange.

Lacticolor. Perianth pale lemon; cup yellow.

Louis le Grand. Perianth white; cup sulphur.

Paper White. Pure white. The earliest and most valuable for very early forcing.

Phyllis. Perianth yellow; cup orange.

Sir Isaac Newton. Perianth yellow; cup orange.

Sir Walter Scott. Perianth white; cup yellow.

Staten General. Perianth white; cup yellow.

The Scilly White. Perianth white; cup sulphur-white.

White Perfection. Perianth white; cup sulphur-white. Fine new variety.

MONSTROSITIES.

Jonquilla plenus (Double Yellow Jonquil). Flowers of a rich, full yellow, small, elegant, richly-scented.

Poeticus patellaris pleno albo cum croceo. This is the large Gardenia-flowered Double White Daffodil, seen in most gardens.

Tazetta nobilissimus. Flowers white, with yellow cup. This variety is cultivated by the Dutch.

Tazetta Romanus (Double Roman Narcissus). Flowers white, with orange cup.

NARCISSUS FLY (*Merodon clavipes*). This two-winged Fly is rather troublesome to Continental gardeners, as it feeds in Narcissus bulbs, devouring the inner parts. It is, however, too rare in England to do much harm, or to call for a long notice here. It is nearly ½in. long, rather like a hive bee in hairiness and form, but with the end of the body blunt. Its colour varies so much that several of the varieties were named and described as distinct species. The thorax is usually yellowish-brown or whitish in front, black behind; the abdomen pale at the base, brownish-yellow or rust-coloured behind. Sometimes the back is metallic-green. The eyes are hairy, and almost cover the front of the head, meeting in front in the males, but separated by a yellow stripe in the females; and there is a golden-yellow tuft of hair at the base of each antenna. The legs are black, and the last pair have the thighs thick, and each bears a tooth near the tip. The grub is like a rolling-pin in form, wrinkled, greyish-yellow, with a row of backward-directed bristles round each ring. It eats out the centres of the bulbs, and, when full-fed, crawls out, and changes into an oval brown pupa in the soil, near the top of the bulb.

Within this present year, Dr. Ritzema Bos has published, in the Archives of the Teylerian Museum, at Haarlem, an exhaustive memoir (of fifty pages, 8vo, with illustrations), upon the Narcissus Fly, under the name *Merodon equestris*. He mentions that it was introduced with bulbs from the South of Europe into Holland, where, so long as forty years since, it made itself noticeable by injuring Daffodils. It seems quite naturalised in that country, though its numbers are markedly diminished by severe winters. Besides the mechanical injury to the plants, Dr. Bos finds that the larvæ excrete an acid, which causes the decay of the tissues around the burrows, and the plants suffer much from the wound being thus extended.

Owing to the mode of life of the larvæ, it is very difficult to employ any good remedy for the extermina-

Narcissus Fly—*continued.*

tion of these insects, but they would probably yield to the methods employed against the **Onion Fly** (which *see*). Of course, sickly plants ought to be removed from among the others without delay. Dr. Bos recommends, as most successful, to keep all bulbs of Narcissus under water for eight days before planting, as this treatment, while not injuring the bulb, will kill the larvæ, which, at the usual season of planting out (August), are still near the upper part, and have not done much damage.

NARCOTIC. Producing sleep or torpor.

NARDA. A synonym of **Strychnos** (which *see*).

NARDOSMIA. Included under **Petasites** (which *see*).

NARDOSTACHYS (from *nardos*, a sweet-scented shrub, and *stachys*, a spike; the Nardus of the ancients was close akin to this plant, and not connected with the modest grass of that name). ORD. *Valerianeæ*. This genus comprises a couple of species of hardy perennial herbs, natives of the Himalayas. Corolla red or purplish; cymes at the apices of the branches or stems, scape-formed, dense, sub-capitate. Leaves entire, radical ones elongated, stem ones few. Root short, thick, fibrous, very fragrant. The species introduced is *N. Jatamansi*, which, according to Dr. Royle, is the Spikenard of the ancients.

N. Jatamansi (Jatamansi). *fl.* in dense small heads, arranged in a trichotomously-branched terminal panicle; corolla pale rose-purple, cylindric, gibbous at base, and contracted into a very short, narrow tube; lobes rounded, dorsal one larger; scape 4in. to 10in. high. September. *l.* tufted, 2in. to 4in. long, rarely longer, elliptic-lanceolate or spathulate, acute; nerves obscure, narrowed into a long or short petiole. Root fusiform, inclined, terminating upwards in a simple or forked ascending stock, 1in. to 3in. long, densely clothed with the black fibrous remains of the old petioles. 1878. (B. M. 6564.)

NARTHECIUM (from *narthekion*, a rod; in reference to the flower stems). Bog Asphodel. SYN. *Abama*. ORD. *Liliaceæ*. A small genus (four species) of hardy, herbaceous, rush-like, marsh plants, inhabiting the temperate regions of the Northern hemisphere. Perianth of six equal, linear, membranous-herbaceous segments, which are yellow, green at back. Leaves distichous at base of stem, equitant, linear, often falcate, rigid, striated. The undermentioned species are well worth naturalising in boggy situations. Propagated by divisions of the root, or by seeds.

N. ossifragum (bone-breaking). *fl.*, raceme uninterrupted, one bract at the base, another above the middle of each partial stalk. June. *l.* rigid, strongly-ribbed, acuminate, equitant. Stem leafless, or with one or two small leaves. *h.* 6in. to 12in. Europe (Britain), North Asia, North America. It was once thought that this plant caused rot among sheep who ate it with other herbage, among which it grows, hence the ill-omened specific name. (Sy. En. B. 1542.)

N. o. americanum (American). *fl.* rather smaller, and leaves narrower, than those of the type. North America, 1811. (B. M. 1505.)

NARTHEX. This genus is now included, by Bentham and Hooker, under **Ferula** (which *see*).

N. Assafœtida (Asafœtida). *See* **Ferula Assafœtida.**

NASMYTHIA. A synonym of *Eriocaulon*.

NASONIA (from *naso*, a nose; the column and anther, together, somewhat resemble a nose). ORD. *Orchideæ*. A small genus of very dwarf-growing epiphytal cool stove orchids, now included, by Bentham and Hooker, under *Centropetalum*. Nasonias require cool treatment, like that accorded to Masdevallias. They grow naturally at great elevations creeping amongst moss and lichens.

N. cinnabarina (cinnabar-red). A synonym of *N. punctata*.

N. punctata (dotted). *fl.*, sepals and petals bright orange-scarlet, about ¼in. long; lip bright golden-yellow; pedicels slender. April. *l.* thick and fleshy, ½in. long, somewhat triquetrous. Stem erect, only 1in. or 2in. high. Peru, 1867. SYN. *N. cinnabarina*. (B. M. 5718.)

NASTURTIUM (an old Latin name used by Pliny, and by him derived from *nasus*, the nose, and *tortus*, twisted; referring to the contortions of the nose caused by the hot, acrid taste of the plants). ORD. *Cruciferæ*. A confused genus (some eighty species have been described by various authors, but probably not more than a score members of the genus are sufficiently distinct to merit specific rank) of hardy branched, glabrous or hairy herbs, of various habit, terrestrial or aquatic; they inhabit the temperate and warmer regions of the Northern hemisphere. Flowers often yellow, small, sometimes bracteate. Pod short or elongated. Leaves entire or variously-lobed, or pinnatisect. The only species that calls for mention here is *N. officinale*, for culture of which *see* **Cress, Water.** The generic name, *Nasturtium*, is frequently applied to the common forms of *Tropæolum*.

N. officinale (officinal). Water Cress. *fl.* white, small, in short racemes. June. Pods ½in. long. *l.* pinnate; leaflets three to eleven, roundish or oblong, nearly entire. Stem much branched, sometimes short and creeping, or floating in shallow water, sometimes scrambling on banks or bushes to the length of 2ft. or more. West Asia and Europe (Britain, in brooks and ditches); introduced into North America and the Colonies, and choking some of the New Zealand rivers. Hardy perennial.

NATANS. Floating under water.

NAUCLEA (from *naus*, a ship, and *kleio*, to inclose; in reference to the hull-shaped half capsule). ORD. *Rubiaceæ*. A rather large genus (about thirty species) of stove trees and shrubs, frequently very glabrous, natives of tropical Asia and Oceania. Flowers yellow, sessile, arranged in globose, compact, rarely bracteate, solitary or paniculate, often large heads. Leaves alternate, often large, sessile or petiolate; stipules rather large, intrapetiolar, deciduous. The species are of easy culture in a compost of loam, sand, and peat. Propagated by cuttings of half-ripened shoots, inserted in sandy loam, under a glass, in heat.

N. Adina (Adina). *fl.-heads* globular; corolla funnel-shaped; calyx superior, five-cleft; segments linear, thickened at the point, green; peduncles solitary, at first terminal, but, by the shooting out of a young branch from the same part, becoming afterwards axillary. *l.* opposite, on short petioles, smooth, shining, ovate-lanceolate, acuminate, with an obtuse point, quite entire, with oblique, nearly parallel veins strongly marked on the under side. Branches villous. China. An upright shrub. (B. M. 2613.) The correct name of this plant is *Adina globifera*.

N. coadunata (united-capsuled). *See* **Sarcocephalus cordatus.**

N. purpurea (purple). *fl.*, corolla purple, with spreading lobes; calyx-limb hirsute, with clavate segments; peduncles terminal, solitary, or in threes. May. *l.* petiolate, oval-oblong, acute or acuminated at both ends, smooth and shining, 4in. to 9in. long. *h.* 15ft. India, 1820. Small tree.

N. undulata (undulated). *fl.* yellow, fragrant, in large and very beautiful globular heads; peduncles drooping, terminal, solitary. May. *l.* petiolate, ovate-oblong, obtuse, undulated, shining. Branches brachiate. *h.* 20ft. Moluccas, 1820. Tree.

NAUMBERGIA THYRSIFLORA. A synonym of **Lysimachia thyrsiflora** (which *see*).

NAUPLIUS. A synonym of **Odontospermum** (which *see*).

NAUTILOCALYX. Included under **Episcia** (which *see*).

NAVARRETTIA. Included under *Gilia*.

NAVELWORT. *See* **Cotyledon Umbilicus.**

NAVELWORT, VENUS'S. *See* **Omphalodes linifolia.**

NAVENIA. A synonym of *Lacæna*.

NAVICULAR. Boat-shaped.

NEÆRA. Included under **Stenomesson** (which *see*).

NEAPOLITAN VIOLET. *See* **Viola odorata pallida plena.**

NECK. The upper tapering end in bulbs or other plants.

NECKLACE-TREE. *See* **Ormosia.**

NECKWEED. A popular name for *Cannabis sativa.*

NECTANDRA (from *nektar*, nectar, and *aner, andros*, a male (stamen); in reference to the three nectariferous barren stamens). SYN. *Porostema.* ORD. *Laurineæ.* A genus comprising about seventy species of trees, or rarely shrubs, inhabiting tropical America from Brazil and Peru as far as Mexico, the West Indies, and sub-tropical South America. Flowers axillary or terminal, pedunculate. Leaves alternate, scattered or rarely sub-opposite, coriaceous, penniveined; primary veins often, not always, more prominent than in *Ocotea.* The only species worthy of mention here is *N. Rodiæi*, the Bibisi-tree or Greenheart of British Guiana. It is a lofty tree, from 60ft. to 70ft. high, and is frequently without branches for the first 50ft. The most valuable part of the tree is its timber, which is imported in large quantities for shipbuilding purposes.

NECTAR. The sweetish secretion of various parts of blossoms, which forms the staple food of many insects, notably bees, butterflies, and moths. For the manner in which this secretion is produced, and its utility to the plant itself, *see* **Nectary.** Nectar is not, as commonly supposed, identical with honey, although, as furnished by many plants, it is the material from which bees make the latter. Analysis has shown the sugar of Nectar to be, very generally, cane sugar, while that of honey is grape sugar, consisting of dextrose and levulose, in equal proportions. The conversion of the cane sugar is brought about by an admixture of salivary secretion at the time the Nectar is sucked up. This conversion has been well made out in the case of bees; and, since larger animals and man are known to convert cane sugar into grape sugar, as an initial process in digestion, it is probable that butterflies and moths effect the same changes as the bee.

NECTARINE. The Nectarine is a form or variety of the Peach, distinguished from it in general characters only by the fruits having a smooth instead of a rough skin. For example, the same tree has, at times, produced fruit of both kinds on the same branch; and even a closer relationship has been recorded in a single fruit being half a Nectarine and half a Peach. Nectarines are, however, sufficiently distinct, in flavour and general appearance, to be constituted and considered as a separate fruit, both for dessert and for exhibition purposes.

Propagation. Nectarines and Peaches are propagated from the stones or seeds; by budding; and sometimes by grafting. The first-named method is employed for raising new varieties, and also for growing stocks whereon other sorts may be worked.

Seeds may be sown under a wall, in a warm position, in autumn, or may be stratified throughout the winter, and sown in early spring. On a small scale, or for special purposes, they may be inserted in pots at the last-named season, forwarded in a little heat, and the seedlings then planted out where they are intended to remain. As stocks, they often grow large enough for budding the first year, and, if properly treated, they may be expected to bear fruit when three years old. When seeds of either the Nectarine or Peach are sown, it is uncertain whether the product will be a form of the one or the other; consequently, named varieties cannot be perpetuated by this method.

Budding is the best and most largely-adopted plan for propagating the fruits under notice. This is practised with what is termed a "dormant" bud in July and August, or a "pushing" bud in April or May. Some shoots with buds must be retarded for use in spring, by being cut early in the season, and buried in sand, under a north wall. It is necessary that only wood-buds be selected and employed: the embryo blossom-buds are useless.

Nectarine—*continued.*

Grafting may be successfully practised in spring. The scions should be firm and short-jointed, and be taken early in the season, with a portion of two-year-old wood attached; they must be retarded until the sap in the stock begins to move. On dwarf stocks, whip-grafting may be practised; and, after the mutilated parts are fitted, and covered with clay, the latter should have earth heaped over it, to preserve a uniform moisture. If it is desired to graft standard stocks that are much larger than the small dwarf ones, the method of crown-grafting may be adopted, the grafts being inserted at any height desired.

Nectarines and Peaches may be budded or grafted on the seedling stocks of the Peach, the Almond, and the Plum. The Peach stock is insufficiently hardy, and is not much used, as, although the buds take freely, and do well for a time, the trees do not long succeed without being overtaken by a disease termed the "yellows." This is, however, much more prevalent in America than in this country. The Sweet Almond belongs to the same genus as the Nectarine and Peach, and all the varieties of the two last-named fruits succeed well on it as a stock, usually in preference to the Plum, which is, however, much more extensively employed. The Almond stocks are raised like the Peach, and may be budded when one year old. Tall standard stems may soon be grown, by keeping the plants tied upright and allowing them to grow away at will. Plum stocks are those generally used, and they answer better in various localities, on account of their hardiness. The Mussel, St. Julian, Black Damask, and White Pear Plums, amongst others, are used as stocks for Peaches. Some of them are stronger-growing than others, and varieties of fruits budded on them have similar peculiarities. By many of the French growers, the Black Damask is preferred; and this, with the St. Julian, Mussel, and White Pear, may be considered the best.

Situation and Soil. The climate of this country will not admit of the Nectarine and Peach being cultivated in the open ground; except in the most favoured localities, a wall with south aspect, or even glass protection, becomes a necessity. The trees may possibly live, and make some growth; but, for fruit production, it is all-important that the wood annually made should also be thoroughly ripened in autumn. Some protection against the evil influences of frost and cold easterly winds on the early-expanding blossoms, is also necessary, in spring, and this is most readily applied over trees on walls. In the warmest parts of the country, where the situation is not too much exposed to wind, or, on the other hand, to cold fogs in spring, Peach or Nectarine-trees may be planted against walls with an east or a west aspect; but a situation fully exposed to the south is that which is necessary in the majority of cases. In the general arrangement of kitchen gardens, the principal walls should be built so as to receive as much sunshine as possible, and the very best position has usually to be accorded the fruits under notice. The special preparation of fruit borders throughout entails considerable labour at first; but the results generally repay the trouble, both by the better success attending the trees planted therein, and also the important crops continually succeeding each other in the cultivated part farthest from the wall. Fruit borders, to be of use for other crops should not be less than 12ft. wide, as nothing should be planted, nor even the ground kept dug, within 3ft. of the wall, supposing the trees are there. A soil enriched with manure is not desirable, as it tends to produce an undue, sappy growth, which lacks blossom buds, and, moreover, does not become ripened. An open, loamy soil is the most appropriate, not too light, on account of being easily dried up, nor, on the other hand, composed of stiff clay: the trees cannot

Nectarine—*continued.*

possibly succeed in this latter. Good drainage is all-important; it must be provided artificially, if the subsoil will not conduct water away readily. When necessary, this can best be accomplished by placing a drain, with a proper outlet, parallel with the wall, and near the outside edge of the border. It should be deep enough to take all superfluous water—say, 3½ft. from the surface—otherwise, the trees will not thrive. About 3ft. depth of soil, of a fairly good description, should be provided, and it is advisable that the border should incline from the wall, thus allowing the part where the trees are planted to be the highest and, consequently, most efficiently drained. Old borders are not suitable for planting Nectarine or Peach-trees in without the addition of some new soil around the roots. Where other conditions are favourable, sufficient might be placed round each tree to give it a good start, and more could be added afterwards, if it were required. A compost of loam and manure, mixed with the natural soil of the border, will always greatly improve it, and do more good to fruit-trees than manure alone. Charred rubbish, old crushed mortar and brick, or burnt clay, should be freely intermixed where soils are inclined to be adhesive; but they are much better not to be of this description, if it can be avoided. The chief points requisite under this heading are, therefore: a favourable position against a south wall for planting; a good depth of soil; and efficient drainage, secured either by natural or by artificial means. Without these provisions, Nectarines and Peaches will rarely succeed satisfactorily.

Planting and After-treatment. The autumn is, undoubtedly, the best season for planting, as, in spring, root-action and vegetation take place early in the trees, and they cannot be removed at that season without receiving more or less check. As early as convenient after the leaves drop, is, perhaps, the most desirable time for planting. All the roots should be carefully laid out at full length in a hole of sufficient size for their reception, and, after a little fine soil has been shaken amongst them, the remaining space should be filled with a prepared compost, as already recommended. About 6in. of space should be allowed between the wall and the tree, and the roots should not be placed at a greater depth than that to which they have previously been subjected. It is advisable to cover the surface with stable litter, so far as the roots extend, and not to secure the branches, except very loosely, until all the new soil has properly subsided. More than ordinary attention will be necessary in watering, mulching, &c., for the first season, or, at least, until the effects of transplanting are over, and the ordinary growth is resumed. Passing on to trees that are established, and in bearing condition, reference may be made to the protection which the blossoms require in spring. Gardeners not unfrequently err in applying too thick a covering, or in keeping it over the trees in mild weather, when it would be better away. Cold storms and easterly winds are most to be guarded against; frost oftentimes does not cause so much injury, unless the flowers become actually frozen, and bright sunshine appears on them while in this state. Movable coping boards, about 1ft. wide, should be fixed on brackets near the top of the wall during the time the trees are flowering, and removed about the end of May. From the edge of these boards, ordinary nets of double or treble thicknesses, frigidum, tiffany, or whatever may be at command, may hang down. If any substance is used which excludes light, it will be necessary to remove it on all favourable occasions. In May, or about the beginning of June, syringing may be practised daily, preferably with the garden engine. It will, at times, be necessary to thin the fruits; but, as a rule, the crops of Nectarines and Peaches which set on trees outside are not much greater than what healthy

Nectarine—*continued.*

trees should be expected to ripen. Caution must, at any rate, be exercised in thinning only those parts where the fruits are unduly thick, or where they are unevenly distributed over the surface of the tree. Untoward circumstances may cause a large number of fruits to drop off before the stoning period is past; in fact, a greater or less proportion invariably do so, on trees both indoors and out. Fan-trained Peach and Nectarine trees that are intended to be permanent should be planted at from 16ft. to 20ft. apart. If a standard and a dwarf are planted alternately, they may be closer to each other than the distance named; or others may be put in between temporarily, with a view to removing them afterwards.

Pruning and Training. Pruning Peach and Nectarine-trees is work which requires frequent attention, but only in winter, when the leaves are off, but also throughout the summer. It should be practised only by persons who understand the habit of the tree on which they are to operate, and, above all, its mode of bearing. The fruits each season are borne principally on wood made the previous year; they are also sometimes produced from short side shoots or spurs, which are, as a rule, well

FIG. 656. NECTARINE AND PEACH. Renewal Spur Branch, showing (*a*, *a*) Wood-buds and (*b*, *b*, *b*) Blossom-buds.

furnished with blossom-buds (see Fig. 656). The chief aim in pruning should be, therefore, to annually introduce as much young wood as space will admit, without any part being unduly crowded, or detrimental exposed to the crop of the current year, and, in the winter pruning, to cut the old fruit-bearing wood away, and allow the new wood to take its place. Medium-sized, short-jointed wood is always most satisfactory; and this can only be obtained by allowing sufficient space for the development of the young shoots under a free exposure to sun and light. Buds are formed at each node as growth proceeds, either singly or in twos or threes (see Fig. 657). They are very differently constituted, and are termed respectively wood-buds and fruit or blossom-buds. The former are thinner and more elongated than the latter, and contain a growing point, surrounded with leaves in a rudimentary state. Fruit-buds contain rudimentary blossoms only, and, in pruning, no shoot should be cut back to a node where these only are present, as it would eventually die back to a wood-bud, whence a new shoot might proceed. Young trees are, as rule, naturally inclined to the production of a preponderance of wood-buds; also, in older—established specimens, fruit-buds usually predominate. In the training of Nectarine and Peach trees on the fan system, it is important that the head should be evenly balanced by the branches on either side of the centre stem from the very earliest stages; otherwise, the tree will always be irregular, the stronger branches will rob the weaker ones, and the upper part, whence the sap most readily flows, will soon succeed in rendering the lower branches weak and unsatisfactory for fruit-bearing. A maiden tree consists of a single shoot,

Nectarine—*continued.*

which grows from the bud the first season. When intended for fan training, it is planted either against a wall or in the open ground, as in nurseries, where temporary stakes are inserted, on which to eventually train the branches. In the autumn, it should be cut hard back to within about three eyes of the place where the bud was inserted. Shoots from two of these eyes should be encouraged to grow, one on either side of the stem, and, if they succeed with equal vigour, the other will not be required. The flow of sap may be checked eventually, should there be a tendency on the part of one leading branch to grow stronger than another, by merely bending the point down, or bringing it into a more horizontal direction. At the same time, the weaker one should be brought more upright, and an opposite effect will be the result. Other shoots, which are intended to form leading branches, will, in due course, be obtained from the base of those already referred to,

FIG. 667. NECTARINE AND PEACH. Branch of Ripened Wood, showing (A) Single, (B) Double, and (C) Triple Buds. *a, a, a* represent Wood-buds; *b, b, b*, Blossom-buds.

and these should also be disposed so as to balance the head as evenly as possible. The centres of young trees should be kept clear; it is never difficult to get them filled at almost any time, when the branches that are required to be at an angle are properly established. A central shoot, allowed to grow upright, would, in any case, be certain to grow too strong. Winter pruning of Peach and Nectarine-trees may be practised, in favourable weather, at any time when the leaves are off, but before the buds expand in spring, and training may follow immediately after. The leading branches should first be placed in position, and secured, the subsidiary ones being arranged afterwards. Experienced cultivators remove weak and misplaced branches at almost any season, when it is seen they are not likely to be of use for fruit-bearing, and train new and better shoots to take the places of those removed. This

Nectarine—*continued.*

may be practised more especially so soon as it is certain the fruits are set, and the strongest and best-placed ones can be selected for bearing. Disbudding is annually of great importance in Peach and Nectarine culture, the number of new shoots which appear in spring being tenfold more than can be accommodated with space. A further reference will be made to this when treating of trees grown under glass.

Cordon training possesses advantages in many respects over the fan method, as it is much easier of accomplishment, a wall may be covered in a much shorter time, and a larger number of trees, and, consequently, of distinct varieties, may be planted in a given space. Single cordons, trained in an oblique direction, represent the system usually practised in this style with the Peach and Nectarine; they may be planted as near as 2ft. apart. Maiden trees, if well ripened, need not be cut back very much, if they are furnished with lateral side shoots throughout, and a good wood-bud is present for shortening to. These laterals should be regulated as equally as possible, on either side of the leader, and be nailed in: the leader must be specially attended to, until its limit is reached. It should, meanwhile, be pinched once or twice during the season, so as to encourage plenty of side shoots, any of which, if not required, may have their points pinched out. All the wood made by established trees on the cordon system, should be intended for fruit-bearing; and, if new shoots are encouraged from the base of the laterals each year, and receive proper attention, by exposure to light, and stopping them from the top of the tree downwards, as they reach their limit, nearly all the old laterals may be taken off, after the fruit is gathered, immediately above the place whence the new ones proceed.

The foregoing are somewhat general remarks respecting the pruning and training of Peach and Nectarine-trees—work which is amongst the most important in gardening operations, and which, moreover, the most lengthy and minute details in books would but imperfectly teach. There are few subjects amongst fruit-trees that require such frequent and timely attention, especially under glass; and, if cultural success would be attained, these operations must be conducted only by persons who are fully acquainted with what is conducive to that end, and are capable of exercising forethought and discretion, which, in this case, must be the outcome of personal experience in performing or assisting with the work.

Cultivation under Glass. There are few gardens where fruit-trees of any description are forced, and the Peach and Nectarine not included. Next to the Vine, their fruits are, in general, the most important; and, if forcing is not resorted to, the trees ripen crops under glass at any season that are far superior to those secured from outside. In the northerly and unfavourable parts of the country, too, glass protection becomes a necessity in order to get fruits to ripen at all. This is sometimes provided in the shape of what are termed glass cases. They consist of upright sashes placed at a sufficient distance only from wall trees to allow of the latter being attended to. The sashes are sometimes made movable, by being placed on rollers at the base, and the portion of roof which connects their tops with the wall should be provided with ventilators. Trees grown under glass are usually trained to a wire trellis—represented by the dotted line in Fig. 658—either fixed or movable, and situated about a foot from the roof. They are also sometimes trained to the back wall; and a combination of both systems may be practised, by limiting the top growth of those at the front part of the house, and planting trees with tall stems at the back. Peach and Nectarine-trees lift readily in autumn, even when of large size, if care is taken in the operation; consequently, it is a good plan

Nectarine—*continued.*

to prepare them elsewhere, and transplant into permanent positions when they are nearly or quite ready for fruit-bearing. It will be necessary to prepare a border inside the house—at least, for those intended to be forced; the roots are also far more under control when thus restricted at all seasons. Efficient drainage must be provided, and a depth of about 2½ft. of soil is recommended. This should be a prepared compost of fairly good loam, some crushed ½in. bones, and plenty of mortar rubbish, well intermixed. The borders should never be allowed to get dry, but, of course, more water will be required at different seasons, according to the various stages in which the fruits may be. Many of the tenderer varieties of mid-season and late Peaches and Nectarines only succeed satisfactorily under glass protection, and all the best are well worthy of it. A Peach-house in which forcing is to be conducted is best constructed as a lean-to, and the roof should preferably be of a steep pitch, and either carried down low at the

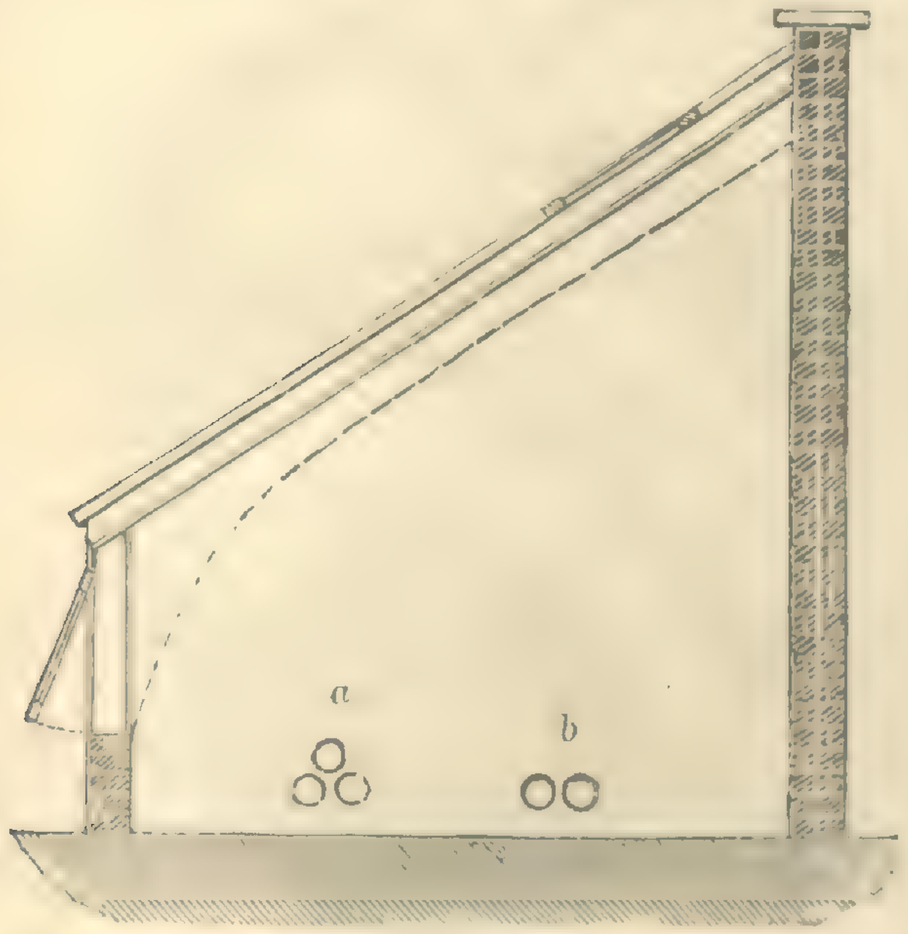

FIG. 658. SECTION OF LEAN-TO PEACH-HOUSE, showing Position for (*a*) three 3in. and (*b*) two 4in. Hot-water Pipes.

front, as shown in Fig. 659—a style that would also answer for constructing as a glass case over trees on

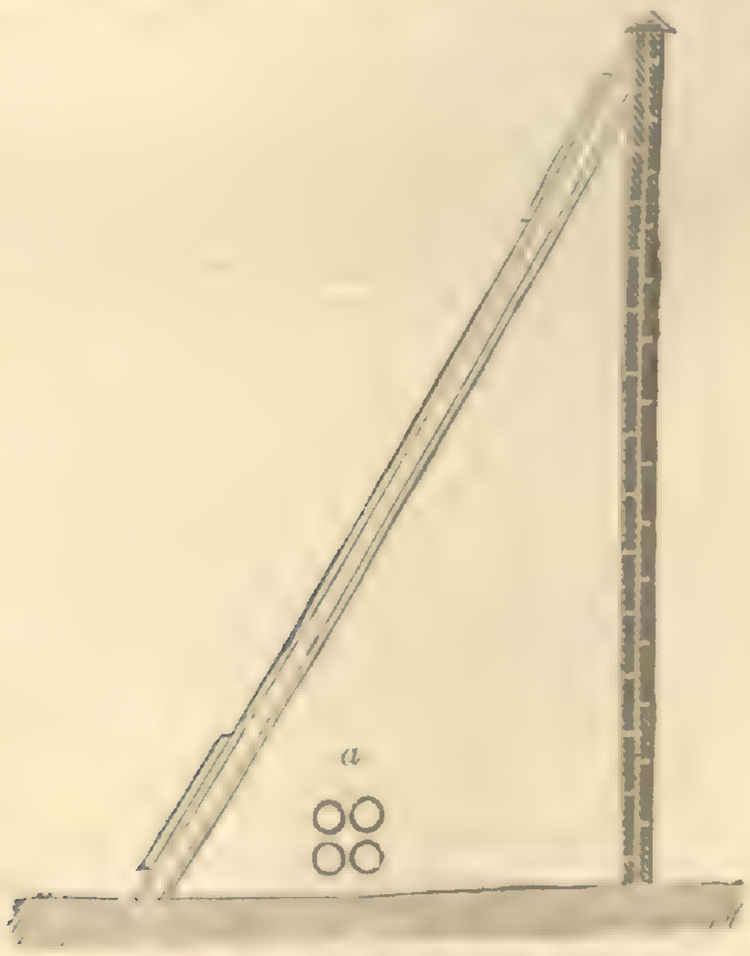

FIG. 659. SECTION OF HOUSE OR GLASS CASE FOR COVERING PEACH AND NECTARINE TREES ON WALLS, showing (*a*) Position for four 3in. Hot-water Pipes.

Nectarine—*continued.*

walls—or be provided with front sashes for the admission of light (see Fig. 658). It should, at any rate, be provided with some method of free ventilation, and, if possible, the roof-sashes made movable, in order that the trees may be subjected to full exposure each year after their fruits are gathered. Fan-trained trees, on dwarf, and also on tall, "rider" stocks, are the shapes most favoured for indoor culture. Cordons are well suited for planting in houses intended for mid-season and late supplies, as an opportunity is thus given of including many fine varieties in a limited space, and excellent fruits are also invariably obtained under this system of training. Sorts thoroughly adapted for forcing are far from numerous; consequently, it is not advisable to rely on any that have not been thoroughly proved. Elruge is, perhaps, the best of all Nectarines for early forcing; it seldom fails in producing a crop, if proper treatment is given. Supposing a good tree of this, and another of an Early Grosse Mignonne Peach, were planted in an early house (these varieties succeed admirably together for the purpose), the Nectarine should be accorded the warmer end if there is a difference, as it will always bear more heat than the Peach. Standard Peach-trees are sometimes grown in orchard-houses, in pots, and also planted in the borders. This style of training is, however, not much favoured by cultivators, and is not here recommended, on account of such a number of fruits being shaded with foliage, and consequently but imperfectly ripened, and of poor quality in comparison with others fully exposed to sun and air during the whole of the time they are swelling and ripening.

The habit assumed by trees bearing stone-fruits—of which the Nectarine and Peach are important examples—may be briefly referred to, as it is by no means well understood. The terms, too, in use respecting various stages through which the fruits pass, have but little significance, unless the meaning of each be explained. So soon as the flowering stage is over, and the fruits are set, what is termed the first swelling begins. After a time, stoning, or the formation of the kernel in the fruit, commences; and, during this process, the latter remains stationary, so far as enlargement is concerned. When stoning is completed, the fruit swells, and, in due course, ripens off. These several stages are termed respectively the flowering, first swelling, stoning, second swelling, and ripening, periods. The seasons for giving assistance to the trees, either by adding a top-dressing of manure over the border, or by an application of liquid manure water to the roots, are naturally those when the fruits are swelling, as, at such periods, a larger amount of nourishment is requisite, and the effect is more marked, than at other times.

Forcing. For obtaining early Peaches and Nectarines, forcing operations may be commenced in November, or early in December. The trees should have been previously well ripened, pruned, and properly tied in position to the trellis, or nailed to the wall, as the case may be; and the house, sashes, &c., should also have been thoroughly cleaned. A mere chink of the ventilators will be sufficient for the first few days, as no trees are more sensitive to heat; and from this arises a danger of the blossoms dropping prematurely. A temperature of 40deg. to 45deg. by night, with a little air and a rise of 5deg. by day, is quite high enough at first; and, if this can be maintained until the flowers expand, by employing a lining of fermenting material, instead of fire heat, it will be far preferable. In any case, fire heat must only be very cautiously applied, until after the fruits are set, as much more harm is to be apprehended from a high, than from a comparatively low temperature, provided this latter does not reach the freezing point. As the flowers expand, a circula-

Nectarine—*continued.*

tion of air, and a drier atmosphere, must be maintained; exposure to the full sun and light must also in no way be hindered. To assist in, and insure, the fertilisation of flowers on early forced trees, many cultivators use a camel's hair brush on each, or a rabbit's tail, lightly drawn over them all, answers equally well. This operation should only be performed when the pollen is quite dry.

So soon as the fruits are set, a heavy syringing with tepid water should be given, to dislodge the fading blossoms; and daily syringings may also be practised from this time onwards. Gradually raise the minimum night temperature to 50deg., and the day to about 65deg., or even higher, by sun heat, and maintain this steadily until the stoning period is over, or the raising of the mean temperature outside, by sun heat, suggests a similar rise under glass. Light and air should be freely admitted during warm weather, in spring, and also when the fruits are ripening; but airing must be cautiously managed during the prevalence of easterly or other cold winds. A good watering will be necessary at starting time, especially if the sashes are not movable so as to admit the early autumn rains. After flowering is past, it should be practised as circumstances require in different cases, at intervals of, say, three weeks or a month. A thorough soaking should be given when watering becomes necessary: the application of only a few canfuls will always prove misleading, in making the surface appear wet, while the roots underneath may possibly be in a much drier medium than that which is desirable. If the roots of early-forced Peach and Nectarine-trees are entirely in outside borders—an arrangement not recommended—they will usually be wet enough from rain—at least, up till the time of the second swelling of the fruit. A thick covering of litter should be kept on the surface of such borders, and also on those partially outside, from starting time until about May, when it should be removed, part at a time.

Thinning the Fruit. Nectarine and Peach-trees in a healthy state, and under proper management seldom fail to set far more fruits than it is desirable should be allowed to remain on them, as not only would the crop be composed of inferior produce, both in size and quality, but the trees would soon become exhausted; the fruits would also drop off in large quantities during the stoning period. So soon as they are about the size of marbles, thinning of such as are underneath, also others off weak shoots, and where they are too thickly placed, should be commenced, and the operation many times repeated at intervals, rather than reduce too severely at once. The fruits finally left should be those as evenly distributed over the tree's surface as circumstances admit. A few frequently fail in stoning, even on healthy trees, and allowance must be made for such; but not to too great an extent, or the evil would be thereby encouraged. An average of one fruit to a square foot of the surface covered by the tree is sometimes recommended; but established healthy trees will bear a much heavier crop than this, if they are fed at the roots when the fruits are swelling. It is not unusual for a good large tree to ripen from twenty to thirty dozens of excellent fruits, not only in one year, but in many. To do this, however, it must be well cared for in every respect, particularly in the thinning, training, and thorough ripening of the wood.

Disbudding. This operation must, of necessity, be largely practised on Peach and Nectarine-trees, as they produce such an enormous quantity of shoots, for which it would be impossible to find space. As before remarked, the fruits are chiefly borne on wood made the previous year, and a supply has annually to be laid in all over the tree for the special purpose of fruit-bearing,

Nectarine—*continued.*

and with a view to afterwards cutting it away, except when required for permanent branches for enlarging the tree. Fruits may also be allowed on the small side shoots or spurs, which should be stopped for their encouragement when enough leaves are formed beyond to cause a free

FIG. 660. FRUITING BRANCH OF NECTARINE, showing Method of Stopping to assist the Development of the Fruit.

circulation of sap (see Fig. 660). Disbudding has for its object the removal of all superfluous shoots at an early stage, retaining the best-placed ones for forming the new wood, and pinching the remainder, to encourage the enlargement of the fruit. It should be performed by degrees, rather than remove a quantity of foliage at one time, and so cause a check to the trees by obstructing the flow of sap. If a good shoot can be obtained from the base of that of the previous year, it should have preference, and be encouraged; the latter (if there is a fruit on it) may have the remaining shoots pinched for the season until the fruit is ripe; it may then be cut away, and the new one take its place. Overcrowding must specially be prevented, by disbudding and pruning; otherwise, neither the wood nor fruits can get sufficient sun and light to ripen them. A few leaves should be drawn aside for allowing a full exposure of each fruit to the sun, when the second swelling begins; and, when ripening, a net, hung loosely to the trellis, underneath the tree, is a good plan for preventing any fruits from falling and becoming bruised.

Diseases, Insects, &c. In America, much more than in this country, a disease called the "yellows" attacks Peach and Nectarine-trees. It is most prevalent amongst trees worked on the Peach stock, and the almost exclusive use of the Plum and Almond is, consequently, the best preventive. The leaves turn yellow, gradually become smaller, and eventually the tree dies. Gumming is much to be dreaded, as, in bad cases, there is little chance of a cure. *See* **Gummosis.** It is greatly encouraged by an over-rich soil. Blistered leaves are chiefly caused by draughts, cold winds, or too much exposure of the young and tender foliage. Mildew is sometimes destructive to the growing points; the immediate application of flowers of sulphur is the best remedy. Any sorts of Aphis may be destroyed by fumigation; and Red Spider and Thrips, great enemies in Peach and Nectarine cultiva-

Nectarine—*continued.*

tion, are best kept down by a frequent use of the syringe, or, better still, the garden engine, and by the damping of the soil, more especially near hot-water pipes. Earwigs and Ants are at times most destructive to ripe fruits; the former may be trapped in hollow pieces of beanstalk, placed amongst the branches, and the Ants may be greatly reduced by frequently disturbing their nests, and pouring water or dusting a little soot amongst them. *See also* **Peach.**

Sorts. Nectarines and Peaches cannot, as a rule, be properly distinguished by the appearance and flavour of the fruit alone; consequently, other characteristics, observable in the different varieties, are adopted by pomologists, to form classes into which the whole number may, according to their several distinctions, be placed. The chief characters on which the classes are founded are: (1) the size of the flowers; (2) the fact of the fruit having a melting flesh, and parting freely from the stone, or a firm flesh which adheres to the stone; (3) the absence or presence of glands at the base of the leaf, or on the petiole (their shape being given in the latter case), and on the leaves being either serrated or crenated. Varieties with free, melting flesh, are termed Freestone, and those with firm flesh are classed as Clingstone. The former are far more numerous than, and superior to, the latter, which, in consequence, are not much cultivated. An entire fruit, and also a section with the stone left intact, of a Clingstone

FIG. 661. CLINGSTONE NECTARINE.

Nectarine, are represented in Fig. 661. The flesh adheres to the stone by the stringy-like substance shown in the illustration. It is also similar in fruits of Clingstone Peaches. The different shapes of glands, and the size of the flowers, termed respectively "large" and "small," are, at times, so near alike as only to be with difficulty distinguished from each other. The following is a selection of the best and most esteemed Nectarines, all of them belonging to the Freestone class.

Albert. Flowers large. Fruit very large, roundish, ripening early in September; flesh yellow, pale red near the stone, of excellent flavour; skin greenish-white, pale red next the sun. Leaves crenate, with kidney-shaped glands. A fine variety, requiring a warm position, or glass protection.

Albert Victor. Flowers small. Fruit large, flattened at the crown, and mottled with red next the sun, ripening outside about the middle of September; flesh juicy, and of brisk flavour, very red near the stone. Glands round.

Balgowan. Flowers small. Fruit very large, broadest at the base, dark red next the sun, pale green, mottled with dull red on the shaded side, ripening at the beginning of September; flesh rich and melting. Leaves crenate; glands kidney-shaped. A remarkably vigorous and hardy variety.

Byron. Flowers very large. Fruit large, roundish, rich orange-yellow, mottled crimson, tender, and richly flavoured, ripening outside from the middle to the latter end of September. Leaves with kidney-shaped glands.

Downton. Flowers small. Fruit large, roundish-oval, deep red on the exposed side, ripening in August and early in September; flesh pale green, melting, juicy, and rich. Leaves crenate; glands kidney-shaped. A vigorous-growing and good bearing variety.

Elruge. Flowers small. Fruit of medium size, roundish or somewhat oval, dark violet-red next the sun, pale green in the shade,

Nectarine—*continued.*

covered with small brownish specks, ripens outside in August and at the beginning of September; flesh whitish, melting, and of the highest class flavour. Glands kidney-shaped. One of the best Nectarines in cultivation. It is an abundant bearer, and, perhaps, the best of all for forcing. STANWICK ELRUGE is a large Nectarine, of excellent flavour, raised from Elruge and Stanwick. The fruits are exactly like those of the last-named parent, and are ripe about the same time, or a little earlier, than Elruge.

Hardwicke. Flowers large. Fruit very large, nearly round, dark purplish-red next the sun, ripening in August; flesh greenish, with reddish tinge next the stone, of excellent flavour. Leaves serrated, without glands. A hardy, free-bearing variety.

Humboldt. Flowers large. Fruit large, with pointed apex, bright orange-yellow, streaked and mottled with crimson on the exposed side, ripening at the latter part of August; flesh orange colour, tender, and richly flavoured. Glands round. A fine free-bearing variety of the Orange Nectarines.

Hunt's Tawny. Flowers small. Fruit medium, or rather small, pale orange, deeply coloured next the sun, marked with small russety specks, ripening about the middle of August; flesh deep yellow or orange, red next the stone, melting and juicy. Leaves serrated, glandless. A useful early variety, of hardy constitution.

Lord Napier. Flowers large. Fruit very large, ovate, depressed at the apex, of a deep very dark crimson colour on every part exposed, ripening outside early in August; flesh white, tender, and of a rich and excellent flavour. Glands kidney-shaped. This is one of the largest and best, and, withal, the earliest variety of Nectarine. It was raised by Mr. Rivers, of Sawbridgeworth.

Newton. Flowers small. Fruit large, bright red or greenish-yellow, mottled according to exposure, ripening in September; flesh nearly white, richly flavoured. Glands kidney-shaped. A handsome variety.

Pitmaston Orange. Flowers large. Fruit large, terminating at the apex in a small swollen point or nipple, deep orange, purplish-red next the sun, streaked, ripening at the end of August and in September; flesh deep yellow or orange, juicy and rich. Leaves crenated; glands round. The tree is free-bearing and hardy. PINEAPPLE is an excellent and improved variety, with a much richer flavour, ripening early in September; it was raised from Pitmaston Orange by Mr. Rivers, and is one of the best Nectarines grown.

Prince of Wales. Flowers small. Fruit very large, greenish-yellow, deep red on the exposed side, ripening in the middle or latter part of September; flesh whitish, red next the stone, melting, and of rich flavour. Glands round. A fine, rather late variety, requiring a warm situation.

Rivers's White. Flowers large. Fruit large, roundish, nearly white, covered with a fine bloom, ripening at the end of August; flesh white, of excellent flavour. Leaves crenate; glands kidney-shaped. Raised by Mr. Rivers from the old White Nectarine, which it still resembles somewhat.

Spencer. Flowers large. Fruit large, flattened, dark crimson all over, deeper on the exposed side, ripening about the middle of September; flesh stained with red almost throughout, melting, and richly flavoured. Glands round.

Stanwick. Flowers large. Fruit large, roundish-oval, pale green, purplish-red where exposed, ripening in the middle and latter part of September; flesh white, tender, juicy, and rich. Leaves crenated; glands kidney-shaped. The stone has a sweet kernel like that of a nut. A fine variety. The tree does not succeed well, except under glass protection.

Victoria. Flowers small. Fruit similar in flavour, and in several other respects, to the Stanwick, but the kernels are bitter; it ripens about the end of August, nearly a month earlier than Stanwick, and does not crack like that variety. Leaves crenate; glands kidney-shaped. A valuable Nectarine, and one of the best. Raised by Mr. Rivers.

Violette Hâtive. Flowers small. Fruit large, roundish, dark purplish-red, marked with pale brown spots next the sun; flesh whitish, deep red near the stone, melting, juicy, and rich, ripening outside at the end of August and early in September. Leaves crenate; glands kidney-shaped. One of the very best varieties, either for forcing or outside culture. It has numerous synonyms, including Aromatic, Brugnon Hatif, Early Violet, Hampton Court, Lord Selsey's Elruge, Violet Musquée, &c.

NECTAROBOTHRIUM. A synonym of **Lloydia** (which *see*).

NECTAROSCORDUM (from *nektar*, nectar, and *Skorodon*, Garlic; referring to honey pores in the flower). ORD. *Liliaceæ*. A monotypic genus, now included, by Bentham and Hooker, under **Allium** (which *see* for culture of the species).

N. siculum (Sicilian). *fl.* green and purplish, in a loose umbel, on drooping pedicels; perianth somewhat bell-shaped; scape 1ft. to 3ft. high. June. *l.* linear-lanceolate, channelled. Sicily, 1832. (B. R. 1912.)

NECTARY. A term that has been used in a somewhat vague way either (1) to denote any appendage in a flower that does not belong to one of the series of parts recognised by botanists as forming ordinary flowers (*e.g.*, the glands in front of the petals in *Parnassia palustris*), without reference to their function and use to the plant, or (2) to indicate that the part so named produces a sweet fluid (*see* **Nectar**), which is retained in the cells on its surface, or soaks out through the walls of the cells or through the stomata (*see* **Stoma**), which many of the Nectaries possess in their surface layer of cells. The word is now almost restricted to this latter use, and is employed to denote simply the nectariferous character of the part, whatever may be its structure, and whatever the nature of the part of which it is a modification.

The relation of the sugary secretions to growth is discussed below, and from this relation it must evidently be present frequently in growing tissues. Flowers present conditions that render rapid growth a necessity at certain times, inasmuch as, just before opening, the various parts of the flower increase much in size, and, after fertilisation, the fruits and seeds usually take on rapid growth. Hence, Nectar may be expected to be largely present in flowers. The many careful observations that have been made of late years by botanists in various countries have shown, among other interesting facts connected with the existence of Nectar in plants, that sugar is present in considerable amount in the tissues of many flowers in which there is no trace of Nectar on any part of the surface; and, also, that Nectaries are frequently present on vegetative organs of plants, *e.g.*, on stipules of Beans, on the small glandular swellings on the leafstalks of species of *Prunus*, and of the Castor-oil plant, and on the secondary leafstalks of various ferns. Since, then, there is a tendency to produce sugar in the flowers, and since the Nectar containing the sugar tends, like other fluids, to soak through the cell-walls, and to appear on the outer surface of the part in which it exists, we can perceive that insects would probably be induced to visit the flowers to collect the Nectar, just as bees visit the stipules of Beans for this purpose. But, in visiting the flowers, the insects are apt to transfer pollen from the anthers of one flower to the stigma of the next of the same kind visited by them, and they thus aid in securing cross-fertilisation; a result which experiments show to be productive, in many plants, of more numerous seeds, and healthier and stronger seedlings, than follow self-fertilisation. It is thus an advantage to such plants to have frequent insect-visitors at their flowers. In many unisexual flowers, the seeds could not be fertilised in the absence of insects, since they produce pollen unsuited for conveyance by the wind to the stigma of the male flowers. Thus, the presence of Nectar is advantageous to both flowers and insects; and there seems good reason to believe that the habit, in insects, of visiting flowers for Nectar, has brought about, in a great degree, the vast diversities of structure and form in both flowers and flower-frequenting insects. It is necessary for the well-being of the plant that the Nectar shall be so placed as to insure that any insect able to reach it shall transfer pollen from the ripe anthers of one flower to the ripe stigma of a flower (usually older) subsequently visited. Hence arise most of the irregularities and peculiarities in the form and in the position of the various parts of flowers; some to insure the access of the suitable insects by the right path, and others to prevent the access of visitors that would remove the Nectar without effecting pollination in repayment of the benefit.

The position of the Nectary or Nectaries in flowers, and the organs of which they are modifications, differ with the kinds of insects for which they are suited; some

Nectary—*continued.*

lie almost on the surface of the flower, *e.g.*, in Carrot, Elder, Ivy, &c.; but most are situated in the deeper recesses of the flowers. The position of Nectaries is also affected by the fact that exposure to water, in the form of rain or dew, injures the Nectar, and renders it unsuited for attracting insect visitors. Hence, the Nectaries have to be protected against this danger also.

From the fact that sugar is present in all growing structures of flowers, and that it is most abundant in the receptacle, in the neighbourhood of the ovary, we should expect to find the Nectaries very generally developed in this region; and such is very often the case. The chief structures that may be modified to form Nectaries are the following: The receptacle often produces Nectar, either over the whole surface (where not occupied by parts of the flower), as in Marsh Marigold (*Caltha palustris*), or on special outgrowths, forming what is sometimes called the disk; and this latter may form a complete ring between any two successive series of parts, *e.g.*, in the Maples; or may be broken into portions surrounding the bases of particular organs, *e.g.*, in cruciferous plants, round the bases of the short stamens. Any of the organs of the flower may be modified to form Nectaries in different plants.

In Poplars, the stigma acts as a Nectary; in *Umbelliferæ*, and in many other plants, the Nectary is closely adherent to the base of the style; in many *Solanaceæ*, it is at the base of the carpels. The stamens may abort, and may be changed into Nectaries, *e.g.*, in *Scrophularia*, &c., or they may bear nectariferous spurs, as in *Viola* (see below), or outgrowths from the filament, or from some point of the connective. On the petals and sepals they often appear, usually as small pits on the inner surface, *e.g.*, in *Fritillaria*, either uncovered, or, as in some species of Buttercups, covered with a small flat scale, behind which the Nectar is formed. In a good many plants, the petals (and less often the sepals) are tubular or spurred, as in Columbine, Hellebore, Aconite, &c., and the inner end of the organ is the Nectary; but in some (*e.g.*, Violet) the spur merely serves to receive the Nectar. In *Viola*, one of the petals is thus extended

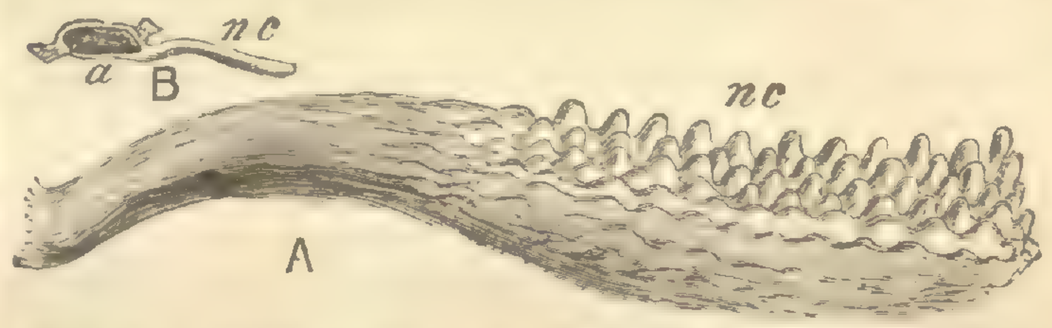

FIG. 662. ANTHER CELLS AND PROCESS OF VIOLA TRICOLOR. A, Process of Anther running into spur of *Viola tricolor*, much magnified—*n c*, Nectar Cells, somewhat exaggerated. B, Anther and Process as removed from flower—*a*, Anther Cells; *n c*, Nectar Cells.

backwards, and curious appendages (*n c*, B, Fig. 662) on two anthers pass into the cavity provided, and there secrete a sweetish fluid. Perhaps no flower presents equal advantages with this to the microscopic tyro who would study Nectar cells; for not only are these large (*n c*, A, Fig. 662), but they lie on the outside of the process (their protection being derived from the covering afforded by the spur-like petal previously mentioned), and, consequently, the difficulties of section cutting are, in their case, altogether avoided. Much has been written upon the nature of Nectaries in the leading European languages; but even the enumeration of the principal works would exceed our space, and we shall content ourselves with naming the following books written in English or translated from German, which are replete with information on the mutual actions of the plants and insects: H. Müller's "Fertilisation of Flowers by Insects" (Clarendon Press, Oxford); Lubbock's "British

Nectary—*continued.*

Wild-flowers in their Relation to Insects"; Kerner's "Flowers and their Unbidden Guests"; Darwin's "Cross and Self Fertilisation of Plants," and various papers by Rev. G. Henslow and others in the publications of the Linnean Society, in the "Popular Science Review," and elsewhere.

In regard to the microscopic structure of the Nectary, the nectar-producing tissue is usually made up of small thin-walled cells that contain abundant protoplasm, a nucleus, and cell-sap, rich in sugar. As a rule, the Nectary shows a number of pores or stomata in the surface layer of cells, and through these the Nectar is poured on to the surface of the organ, whence it is sucked up by the visitors to the flowers. There is usually only a thin cuticle, or it is even absent practically in some plants, over Nectaries; and frequently, the Nectar soaks out through the thin walls of the cells to the surface; but it may be retained inside the surface layer, in cells so thin walled as to be easily pierced by the proboscis of the insects suited to convey pollen to the stigma.

The Nectary has also been microscopically studied by Mr. Cheshire, some of whose results and illustrations (engraved from his own drawings on the wood), as given in "Bees and Bee-Keeping, Scientific and Practical," are here, by permission, introduced. Taking a recently-expanded blossom of the common scarlet Pelargoninm of gardens, which is selected because it is at command, in most places, and at every season of the year, we find, running down the flower stalk, and immediately under the uppermost and broadest sepal, an enlargement of the stalk itself, marked off by inconspicuous grooves, and terminating in a small bulbous expansion a little

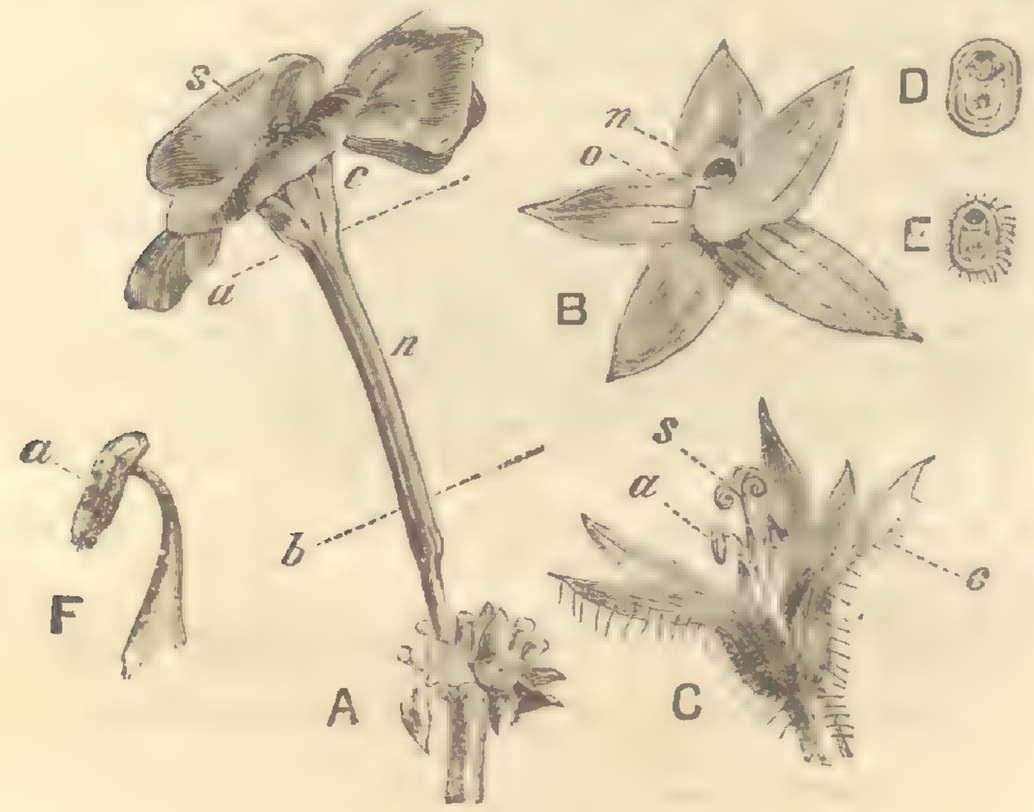

FIG. 663. PELARGONIUM BLOSSOM AND NECTARY.

A, Pelargonium Blossom—*s*, Stigmas; *c*, Calyx; *n*, Nectary. B, Calyx, with Ovary in cross section—*n*, Nectary; *o*, Ovary. C, Blossom, side view, Corolla removed—*s*, Stigmas; *a*, Anther; *c*, Calyx. D and E, Cross Sections of Ovary, through lines *a* and *b* of A. F, Stamen—*a*, Anther.

below the line *b*, Fig. 663, and which is often purplish in colour. This is the Nectary; and, if we now remove the petals, and look at the calyx from the front, we shall see into its opening (*n*, B). Making cross sections through the lines *a* and *b*, we find the Nectary wider above, as at D, and narrow below, as at E. A keen razor, dipped in methylated spirit, will take off slices sufficiently thin for microscopic examination under a cover glass in water. Cutting D longitudinally, so that the Nectary is divided, and then removing a thin slice from that which forms the upper part of the figure, and magnifying about 200 diameters, we find the outside to consist of cuticular cells, carrying glandular hairs (*gh*, Fig. 664),

Nectary—*continued.*

which secrete a resinous body of strong odour. The cells on the opposite side of the section are not unlike those of the external cuticle, although they constitute the

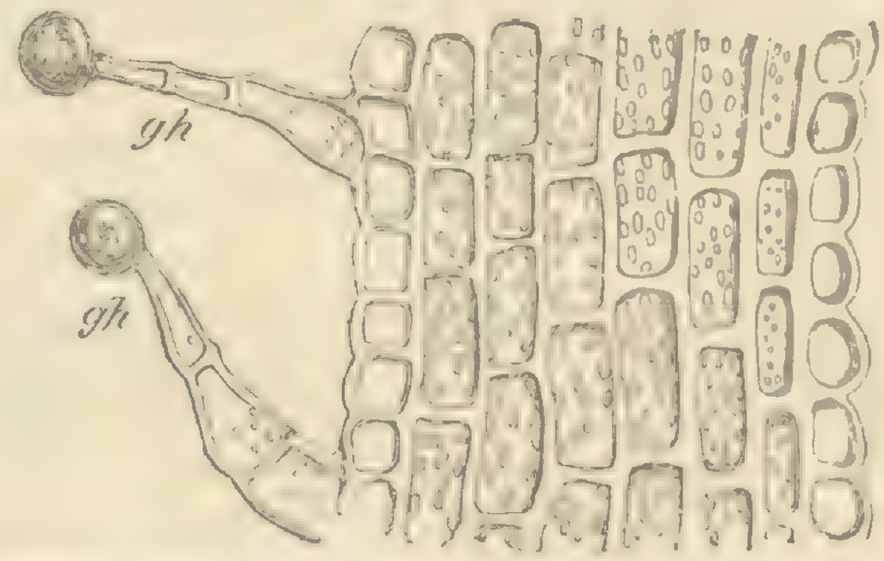

FIG. 664. VERTICAL SECTION THROUGH D, FIG. 663, showing (*gh*) Glandular Hairs.

lining of the upper part of the Nectary, for they have here no secretory function. Taking a section (see Fig. 665)

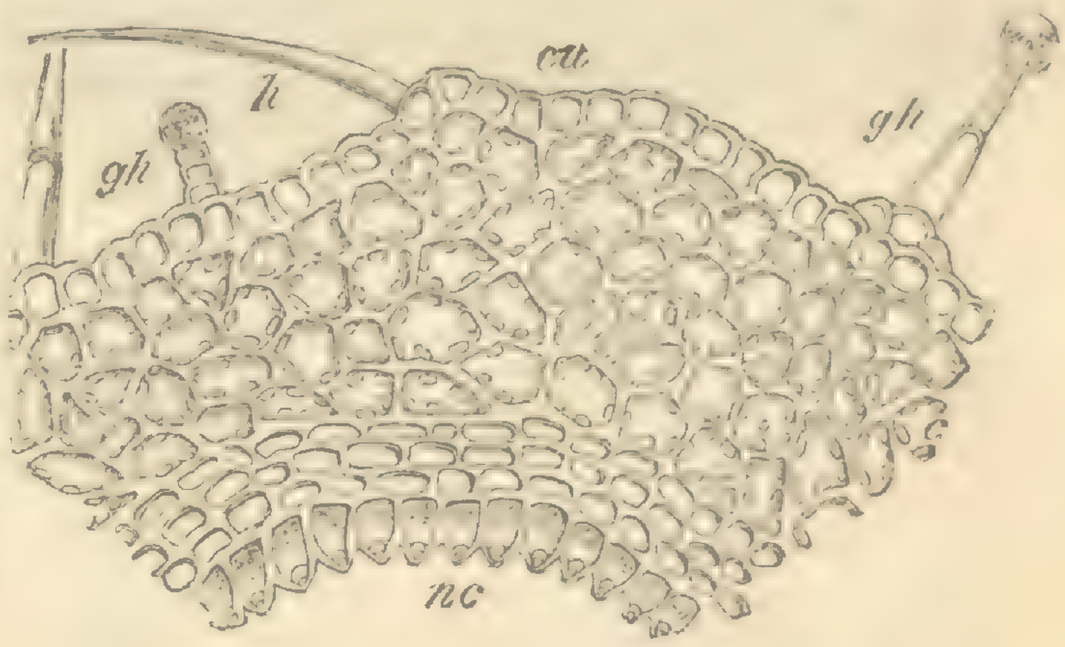

FIG. 665. CROSS SECTION THROUGH E, FIG. 663—*gh*, Glandular Hairs; *h*, Hair; *cu*, Cuticle; *nc*, Nectar Cells. Magnified 180 diameters.

from the face of E, which lies in the line *b* (A, Fig. 663), we discover the hairs and cuticle to be of precisely the same character as those previously noticed; but the lining cells (*nc*) of this part of the Nectary are totally different, extending inwards by almost pointed prominences. The structure of the pointed cells is quite special, their contents, as seen under high magnifying power, being granular, especially near the cell-wall, which, at the prominence, is excessively thin, and has, lying immediately within it, a globular mass of highly refractive

FIG. 666. NECTAR CELLS, Magnified 1000 diameters, showing (*n*) Nectariferous Nucleus.

protoplasm (*n*, Fig. 666), containing a distinct nucleus. This is the active agent in accomplishing the secretive act, and the surface of the cells here, in healthy plants, and in proper conditions of the atmosphere, will always be found to be coated with a layer of Nectar.

To understand the presence of Nectar in a plant, and the uses to which it is put, a short explanation is neces-

Nectary—*continued.*

sary in regard to the use of sugar to plants. There is reason to believe that sugar is one form in which part of the food, formed by plants for themselves from that taken in by them, is retained for a short time in a state that is readily available for use in forming new cell-walls in growing organs, or other substances of the same general composition. Wherever growth is active, sugar is present in the tissues, and gives its characteristic results when tested for. Hence, sugar is present, one may say, in the tissues of all flowers, whatever the mode of their fertilisation; but in some, the sugar is retained in the tissues, while in others it is contained in the surface cells, or oozes out on the surface of certain parts called Nectaries, which serve as the attraction to insects. Besides floral Nectaries, or those in the flowers, there are also in some plants (*e.g.*, in some Ferns and in the common Bean) extra floral Nectaries. In the Bean, they are on the stipules, and form a great attraction to bees in the search for honey. In the Bracken Fern (*Pteris aquilina*), the Nectar flows from small, pale swellings at the bases of the secondary petioles. It has been found that emission of water vapour into the atmosphere, and emission of Nectar on the surface of the Nectary, are so related that what favours the one, retards the other. In the flowers, it is usually emitted most abundantly in the early morning, diminishes till afternoon, and again increases towards evening. It is generally found to be more abundant in flowers of the same kind, the colder the climate.

The position of the Nectary (*n*, B, Fig. 663) now demands attention. It lies above the anthers and stigmas, and an insect, in seeking sweets, would insert the tongue with the body in such a position that its hairs would dust off the pollen, or else rub against the stigmatic faces. It may be observed, in a Pelargonium truss, that recently-opened blossoms have their anthers

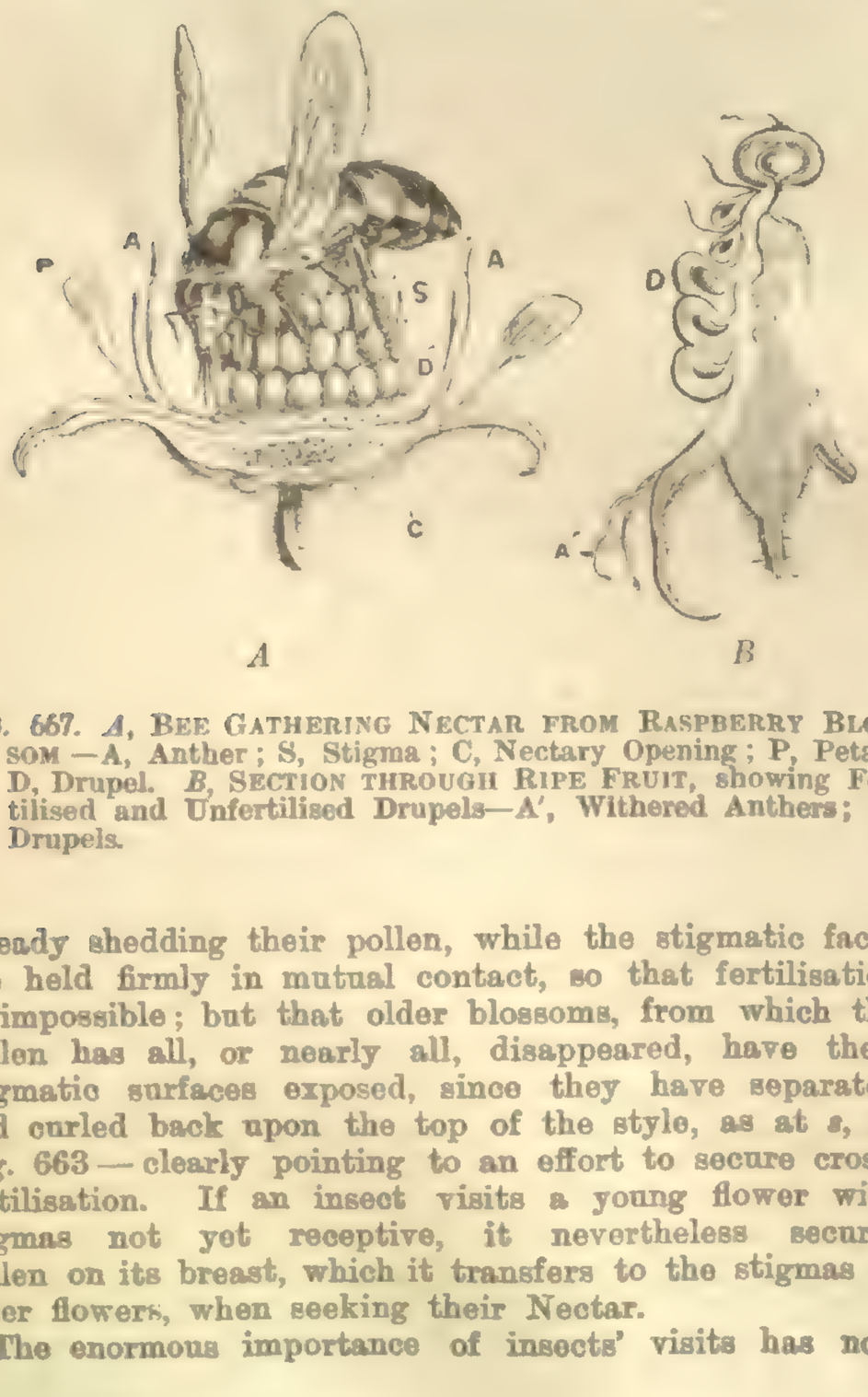

FIG. 667. *A*, BEE GATHERING NECTAR FROM RASPBERRY BLOSSOM—A, Anther; S, Stigma; C, Nectary Opening; P, Petal; D, Drupel. *B*, SECTION THROUGH RIPE FRUIT, showing Fertilised and Unfertilised Drupels—A', Withered Anthers; D, Drupels.

already shedding their pollen, while the stigmatic faces are held firmly in mutual contact, so that fertilisation is impossible; but that older blossoms, from which the pollen has all, or nearly all, disappeared, have their stigmatic surfaces exposed, since they have separated and curled back upon the top of the style, as at *s*, C, Fig. 663—clearly pointing to an effort to secure cross-fertilisation. If an insect visits a young flower with stigmas not yet receptive, it nevertheless secures pollen on its breast, which it transfers to the stigmas of older flowers, when seeking their Nectar.

The enormous importance of insects' visits has not,

Nectary—*continued.*

until recently, been realised. *See* **Hybridising** To mention only a few instances, our orchard and fruit crops, and leguminous seeds, forming together no inconsiderable fraction of human food, are very largely dependent upon insect agency, and the fee paid for professional attendance on the part of the insect inoculator, is Nectar. Let us take, as an illustration, a common Raspberry. The nectar glands have their tiny openings (C, Fig. 667) set in a ring just within the very numerous anther filaments. The stigmas (S) of the various drupels (D) need the pollen to be passed from the anthers (A) to the surfaces of the former, but the interval between the two is considerable. A bee settles, and, in applying her tongue consecutively to the circularly-disposed sources of supply, makes a revolution. The side of the body is thus dusted with pollen; but this is not transferred to the stigmas. Flitting to a neighbouring blossom, she generally revolves the body in the opposite direction, so as to rest the legs previously most exercised, and so transfers the pollen before gathered to the waiting stigmas, thus securing cross-fertilisation. If the stigmas be not in this way pollinated, the drupels do not develop, and we get, on part of the Raspberry, shrunken greenish-grey abortions, of which two are seen in the section. These failures are common late in the season, in consequence of imperfect insect action.

NECTRIS AQUATICA. A synonym of **Cabomba aquatica** (which *see*).

NEEDLE FURZE. *See* **Genista anglica.**

NEGUNDO (said to be a native Asiatic name). Box Elder. ORD. *Sapindaceæ*. A small genus (four species) of hardy trees, allied to *Acer*; they are natives of temperate North America and Japan. Flowers dioecious, small, long-stalked, pendulous, unfolding before the leaves; the males cymose-fasciculate, the females racemose and shortly pedicellate. Leaves opposite, pinnately three to five-foliolate; leaflets petiolulate, induplicate in vernation. For culture, *see* **Acer.**

N. aceroides (Maple-like).* *fl.* green, dioecious; males in fascicles, on filiform pedicels; females in racemes; petals absent. Spring. *l.* pinnate, with three to five opposite, coarsely and deeply toothed leaflets, with the odd one usually three-lobed. *h.* 40ft. North America, 1688. A very ornamental tree. SYN. *N. fraxinifolium.*

N. a. crispum (curled). A form having its leaves variously cut and curled, but not nearly so vigorous as the type.

N. a. laciniatum (laciniated). *l.* more deeply cut than those of *N. a. crispum*. This is also less vigorous than the typical species.

N. a. variegatum (variegated).* A handsome variegated-leaved kind.

N. cissifolium (Cissus-leaved). *l.* trifoliolate, small, light green. *h.* 5ft. to 10ft. Japan. An elegant small species. SYN. *Acer cissifolium.*

N. fraxinifolium (Ash-leaved). A synonym of *N. aceroides.*

N. nikoense (Niko). *l.* trifoliolate, shortly stalked, the petioles and under surfaces of which, as well as the shoots, the buds, and the cells of the large fruits, are very hairy. Japan, 1881. A most distinct species.

NEILLIA (named after Patrick Neill, of Edinburgh, secretary of the Caledonian Horticultural Society, in the early part of this century). SYN. *Adenilenia.* ORD. *Rosaceæ.* A genus comprising four or five species of hardy branching shrubs, inhabiting Northern India and Java, Manchuria, and North America. Flowers white, racemose or paniculate, rather large; calyx persistent; tube campanulate or broadly turbinate. Leaves simple, variously lobed and toothed. The species here described are probably the only ones introduced. They form excellent plants for shrubberies; the two last-named, however, require a little protection in winter. Almost any soil will suit them, and propagation is effected by

Neillia—*continued.*

nearly ripe cuttings, inserted in sand, with a hand glass over them; or by seeds.

N. amurensis (Amur). *fl.* white; filaments of stamens reddish. Summer. *l.* subcordate-orbiculate, three to five-lobed; lobes acute, sharply doubly serrated, with a thin white stellate pubescence beneath. *h.* 4ft. to 7ft. Amurland. A compact-growing, handsome shrub. (R. G. 489, under name of *Spiræa amurensis*.)

N. opulifolia (Guelder Rose-leaved).* *fl.* white, disposed in umbel-like corymbs, and succeeded by purplish, membranous pods. June. *l.* roundish, palmately somewhat three-lobed and heart-shaped. *h.* 5ft. North America, 1690. SYN. *Spiræa opulifolia*.

N. o. aurea (golden).* This only differs from the type in the fine golden-yellow tint retained almost throughout the season by the leaves.

N. rubiflora (Bramble-flowered). *fl.* twice the size of those of *N. thyrsiflora*; racemes terminal, solitary; calyx furnished with pedicellate glands. *l.* cordate, three-lobed, acuminated, doubly serrated; stipules entire. *h.* 6ft. Nepaul.

N. thyrsiflora (thyrse-flowered). *fl.*, racemes spicate, disposed in a terminal thyrse; calyx silky. *l.* cordate-ovate, three-lobed, doubly serrated. *h.* 6ft. Nepaul.

NEIPPERGIA. A synonym of *Acineta*.

NEJA (a meaningless name, invented for this genus by Don). ORD. *Compositæ*. A small genus (now regarded, by Bentham and Hooker, as synonymous with *Hysterionica*) of half-hardy herbaceous perennials or under-shrubs, generally hispid with long spreading hairs, and bearing scattered, narrow, linear, finely-pointed leaves. The undermentioned is a compact little plant, and produces an abundance of flower-heads. It has a very neat appearance in the borders, and thrives in any common garden soil. Propagated by seeds, or by divisions.

N. gracilis (slender).* *fl.-heads* yellow, solitary, on long stalks. May to October. *h.* 1ft. Uruguay (wrongly ascribed to Mexico, in books), 1828.

NELITRIS (from *ne*, privative, and *elytron*, a seed-case; in reference to the berry being without any partitions). SYN. *Decaspermum*. ORD. *Myrtaceæ*. A genus of stove shrubs or small trees, natives of tropical (mostly Eastern) Asia, and tropical Australia. About a score plants have been described by various authors; but probably not more than four or five are worthy of specific rank. Flowers small, pedicellate, in axillary racemes, or often forming terminal, leafy panicles. Leaves opposite, penniveined. The undermentioned species thrive in a well-drained mixture, composed of turfy loam, to which may be added about a third of dry cow-manure and a small quantity of sand. Throughout the growing season, they require an abundant supply of water, but must be kept drier during the season of rest. Cuttings of half-ripened shoots root in sandy soil, when placed under a bell glass, in bottom heat.

N. Jambosella (Jambosella). *fl.* white; peduncles axillary, one-flowered, nearly the length of the leaves. *l.* ovate, acute. *h.* 6ft. to 8ft. New Caledonia, 1810. Shrub.

N. paniculata (paniculate). *fl.* white, terminal, axillary, paniculate. May. *l.* oblong, acuminate. *h.* 10ft. Moluccas, 1826. Shrub.

NELUMBIUM (*Nelumbo* is the Cingalese name of *N. speciosum*. Sacred, or Water Bean. SYN. *Cyamus*. ORD. *Nymphaaceæ*. This genus comprises only a couple of species of beautiful greenhouse or nearly hardy aquatic plants, of which one is American and the other Asiatic or Australian. Flowers on long stalks, traversed by a number of air-canals, regularly disposed; corolla of numerous deciduous petals, arranged in several rows; "the stamens are numerous in several rows, attached with the petals to the base of the receptacle; the stigma is sessile; the receptacle or torus is in form like a funnel; and the ovaries, which are numerous,

Nelumbium—*continued.*

are placed in sockets on the upper surface" (Masters). Leaves peltate, on the summit of long cylindrical leaf-stalks, springing from an elegant horizontal rootstock. The species thrive in a compost of rich loam and well-decomposed manure. Under glass the rhizomes may be placed a few inches, or a foot or more, beneath the surface of the water; in warm tanks or ponds outside there should be, at least, a foot of water above them. They are admirably suited for large aquaria, under glass, and would, probably, thrive in tanks in the open air in the South of England. In the Jardin des Plantes, at Paris, a large circular tank, sunk below the level of the ground, is planted with *N. speciosum*, and forms a very attractive feature of the gardens during summer. In autumn after the leaves have died off, a glass cover is placed over the tank, and throughout winter a covering of straw, or some other protecting material, as well. In spring the latter is removed, and afterwards the glass cover, when growth has sufficiently advanced, and all danger of frost has passed.

FIG. 668. NELUMBIUM LUTEUM.

N. luteum (yellow).* *fl.* yellow, fragrant, resembling a double Tulip, very large, sometimes spreading out more than 1ft. in diameter; anthers drawn out beyond the cells into a large appendage. July. *l.* of a peculiar bluish green, 1ft. to 1½ft. in diameter. West Indies and Southern United States, 1688. See Fig. 668. (B. M. 3754.)

N. speciosum (showy).* Egyptian Bean of Pythagoras. *fl.* white, rosy-tipped, very fragrant, about 1ft. in diameter; anthers drawn out beyond the cells into a club-shaped appendage; peduncles longer than the petioles, erect, scabrous. Summer. *l.* large, 1ft. to 2ft. in diameter, exactly peltate in the centre, orbicular-entire, glaucous, under surface pubescent, margin somewhat waved; petioles long, rising beyond the surface of the water, scabrous with acute tubercles. Trunk of the root horizontal, fleshy, white, sending out many fibres from the under surface. Asia, 1787. A beautiful aquatic, which should be grown in tubs, and

Nelumbium—*continued.*

placed in shallow water. It thrives in warm sheltered tanks in the open during summer. This plant has been regarded from the most remote periods as the emblem of fertility. (B. M. 903, 3916, 3917.) There are several varieties of this species.

NEMACONIA. A synonym of **Ponera** (which *see*).

NEMASTYLIS (from *nema*, a thread, and *stylos*, a column; referring to the slender style). SYNS. *Chlamydostylis*, *Eustylis*, *Nemostylis*. ORD. *Irideæ*. A genus comprising about half-a-dozen species of half-hardy bulbs, natives of Mexico and North and tropical America. Flowers in few or somewhat numerous-flowered spathes, pedicellate; perianth segments ovate; spathe oblong or narrow. Leaves narrow, long, sometimes sub-terete, rarely narrow-ensiform; floral leaves one or two. Bulb tunicated. The species thrive in well-drained sandy loam: for pot culture they do best in a cold frame near the glass, or in a light, cool house. After the leaves have died off, the pots must be kept dry and stored in a cool place until the following spring. Increased by bulb offsets, or by seeds.

N. acuta (acute).* *fl.* blue, yellow, black, solitary, terminal, very fugacious, falling to pieces within a few hours of their opening. *h.* 6in. South-western United States, 1875. SYN. *N. geminiflora*. (B. M. 6666.)

N. cœlestina (celestial blue). *fl.* bright blue, mostly solitary, terminal; perianth six-parted, the divisions oblong-obovate. May and June. *l.*, radical ones few, elongated, sheathing; stem ones diminishing upwards, the uppermost bract-like. Stem 1½ft. to 2ft. high. South United States, 1882. (R. G. 1081, Fig. 1.)

N. geminiflora (twin-flowered). A synonym of *N. acuta*.

NEMATANTHUS (from *nema*, *nematos*, a thread, and *anthos*, a flower; the flowers of one species hang down from long, thread-like footstalks). ORD. *Gesneraceæ*. A small genus (three or four species) of very ornamental, stove, evergreen, climbing, fleshy, Brazilian shrubs. Flowers large, solitary or twin, axillary; corolla with an obconical tube gradually merging into a funnel or bell-shaped expansion. Leaves opposite, thick, entire, glabrous. The species thrive in a compost of sandy peat and turfy loam, with charcoal and dried cowdung. Propagation may be freely effected by cuttings inserted in sandy soil, and kept rather dry.

N. chloronema (green-threaded). *fl.* scarlet, 2in. long, beset with white hairs outside. July. *l.* oblong-lanceolate, acuminated at both ends. 1841. (B. M. 4080.)

N. corticicola (epiphytal). *fl.* scarlet, beset with scattered minute hairs; peduncles 6in. to 12in. long, clothed with violaceous and white hairs. *l.* broad-lanceolate, acuminated at both ends. 1848. (B. M. 4460; F. d. S. 498, under name of *N. ionema*.)

N. ionema (violet-threaded). A synonym of *N. corticicola*.

N. longipes (long-stalked). *fl.* bright red, about 2in. long, with the segments of the tube suddenly reflexed; stalks thread-like, 3in. long. December. *l.* thick, fleshy, oblong, deep green. Stems erect, 1½ft. high. 1841. (B. M. 4018.)

NEMATOCERAS. A synonym of *Corysanthes*.

NEMATOID WORMS (*Anguillulidæ*). The importance of this group of microscopic animals, as giving rise to disease in both wild and cultivated plants, is becoming ever more fully recognised with the extension of careful researches into the nature of diseases that were formerly ill-understood. They differ much from the earthworms, and other true worms, and exhibit a much lower type of structure. They are minute, white or translucent, and usually so small as to resemble short, slender, pieces of hair, even when visible at all without a magnifying glass. All those kinds that cause disease in plants are very minute, and live in the interior of the parts they attack, so that these parts must be cut into, or opened, before worms can be discovered. When seen through a microscope, they appear slender, tapering both ways, but the front end, in which is the mouth, is rather blunt, the hinder end, or tail, is usually long, and tapers gradually, or it may bear an extension of the skin along one or both sides. There is no head; nor are there limbs or organs of sense of

Nematoid Worms—*continued.*

any kind visible. The mouth opens in front; on the gullet and intestines there are usually two swollen muscular bodies, which serve for helping to prepare the food in its passage downwards. The intestine opens below in the anus, some distance from the end of the body, the tail, of varying length, lying behind it. The characters of the genera and species are recognisable usually in the mature animals alone. The situation of the sexual openings, and, in the males, two horny outgrowths, connected with reproduction, assist in supplying distinctive characters, as do also peculiarities in the internal organs, which can be made out, with no great difficulty under the microscope, in the living animals. The *Anguillulidæ* are very numerous in species, and they show considerable diversity in habits and modes of life. A few live as parasites in the intestines of animals, *e.g.*, *Oxyuris vermicularis* in man. Many, probably most, live free in damp earth, or in mud in which there is abundant decaying organic matter, or in decaying plant-remains under water. A certain number live in plants; some in the roots, producing galls or swellings; others in the green vegetative organs (*e.g.*, in leaves of Plantago, of some grasses, such as *Agrostis alba*), or in the ovary (*e.g.*, in Wheat). Only the plant parasites are here dealt with. They chiefly belong to a genus called *Tylenchus*, though much attention has been drawn to the ravages of another Nematode, known as *Heterodera Schachtii*, because of the injury done by it, in Germany, to the roots of the Sugar Beet, as well as to other plants—both wild and cultivated. The species of *Anguillulidæ* seem to be very widely diffused over the world; though the difficulties of identifying the species are so great as to render unreliable the conclusions arrived at by anyone save an expert. The plant parasites usually give rise to a much-increased growth of cellular tissue, thus producing galls of a characteristic aspect. On microscopic examination of sections of the galls, the cells in them are generally found to be much larger than in healthy tissues, and less regular in arrangement and form; and they leave large inter-cellular spaces, or else one large, irregular central space, in which are found numerous young animals, together with oval or cylindrical eggs, the walls of which are so thin as to allow the young animal coiled up in each to be easily seen. Less frequently, along with these may be seen one or two mature individuals. The galls have usually a peculiar colour, due to sap in the cells near the surface. As a rule, there is no trace of an opening to be seen in the mature galls. The young animals seem to be dispersed chiefly by the galls decaying and setting free the eggs or young in the soil, to be blown about with the dust in dry weather. Several of the species—notably that which causes "bunt" in wheat (*Tylenchus Tritici*)—have a curious faculty of reviving in moisture, after having been dried up for months, or even years. They also seem capable of enduring extremes of cold and heat, up to 125deg. Fahr., without being destroyed; and they are not susceptible to vegetable poisons, though they perish in solutions of acids and of most metallic compounds. In pure water, they survive for a long time.

Cereals are very liable to be attacked, *Tylenchus Tritici* galling the ovaries, while *T. devastatrix*, Kühn (*T. dipsaci*, J. Kühn), attacks the stalk, and the inflorescences of the Rye, of various other grasses, and of many other plants, *e.g.*, the Teasel (*Dipsacus Fullonum*), Clovers, Buckwheat, &c., causing them to remain stunted, with short internodes, and to become yellow. The former species is not troublesome to gardeners; the second one is injurious to many cultivated, as well as to uncultivated, plants. Both species of *Tylenchus* live entirely hidden from sight, as already described. The males of the genus *Tylenchus* have usually a thin skin or free

Nematoid Worms—*continued.*

membrane attached along one side of the hinder part of the body and the tail. Many other plants suffer through attacks of animals of the same genus; but the hurtful species are not fully known, and considerable doubt exists as to their true number as well as to their relationship to one another. During the past few years, their presence in a good many garden plants has been recorded in the "Gardeners' Chronicle," and other horticultural journals. The diseases produced by them often seriously damage, if they do not even kill, the plants. Not less dangerous than the above are the Nematodes that gall the roots of plants. The swellings usually are to be seen on the root tips, though often they occur higher up the root. They vary greatly in size, from little larger than a pin's head, on fine roots, to the size of a hazel-nut, or even larger. They are usually nearly round, or oval, though irregular forms are also common. The swelling is due to increase in the cellular tissue alone, the fibro-vascular tissue being hardly altered in any way. They are known to occur on a very large number of plants, both native and exotic, wild and cultivated, from grasses to Clover, and even on Coffee-trees, in South America. Among the most valuable plants injured by them must be specially mentioned the Sugar Beet, in its various forms, and also occasionally the Grape Vine.

In the galled roots of many plants a Nematode is met with, characterised by the fertile female becoming swollen, so as to resemble a lemon in form, with traces of the head and tail at the two ends. The female's body becomes united to the surrounding tissues, so as ultimately to look like a large cell merely, in which lie eggs, or young larvæ newly emerged from the eggs. This Nematode has received the name of *Heterodera Schachtii*. Attempts have been made to show that almost all root galls of Nematodes are the work of this species; but in Scotland the writer has never met with *Heterodera* in root-galls, but only with true species of *Tylenchus*. The animals, in autumn, pass from the food-plants, when these die and decay, into the surrounding soil, ready to make their way the following spring to the new crop of food-plants, should there be any such within their reach. Hence, the best mode of prevention consists in changing the crops on any piece of ground, so as to prevent suitable food for the Nematodes being afforded during the ensuing season. On infested soil, therefore, plants liable to attack should be followed by others unsuitable as food for the Worms. It is well, also, to use only clean seed, from a crop in which the disease has not appeared; and farmyard manure is somewhat dangerous, as liable to spread the Worms from diseased to healthy plants, either in the garden or the field.

If any plants show signs of being severely attacked, they should be at once burnt, to prevent extension of the disease from them to others that are healthy.

NEMATOPHYLLUM. Included under **Templetonia** (which *see*).

NEMATOSTIGMA, of Dietrich. A synonym of **Libertia** (which *see*).

NEMATUS. A very large genus of *Tenthredinidæ*, or Sawflies, of much importance because of the harm done by the larvæ to various trees and shrubs, but especially to Willows, Gooseberries, and Currants. They are the type of a sub-family, *Nematina*, that has the larva provided with fourteen sucker feet. In this sub-family it is distinguished from the other genera by the form and arrangements of the nerves of the front wings, and of the cellules formed by them. The insects are never large, and they bear so great a likeness to one another that it is most difficult to distinguish the species, since they are mostly smooth and shining, are seldom, if ever, punctured, and do not vary in pubescence. By their colour, the species may be divided

Nematus—*continued.*

into groups: (1) Abdomen wholly black; (2) abdomen banded with red; (3) body black and yellow; (4) body wholly yellow, or slightly marked with black; (5) body green. These groups, however, grade into one another. Mr. Cameron, in his work on *British Sawflies*, says that there may be 400 species of this genus in Europe, and he describes 107 from Britain alone. The larvæ vary much in habits. Some are gregarious, while others are solitary; most feed exposed, but some roll up the edge of the leaves, to form a tube, in which they live; and others form pea or bean-shaped galls on the leaves of Willows. Indeed, few kinds of these latter plants are entirely free from their galls; while on some bushes almost every leaf is loaded with them. The larvæ, when full fed, generally burrow an inch or two into the soil, and there form cocoons. The pupæ are usually green, often with a mixture of orange. It is impossible here to enumerate all the trees and bushes that are attacked by the larvæ; but a few of the more important are described. Gooseberries are ravaged by *N. Ribesii*, *N. appendiculatus*, and *N. consobrinus*; *N. abbreviatus* feeds on Apples and Pears; several kinds feed on Alder, others on Birch; very many are to be found on Willows of all species. Of the Willow Sawflies, the following are gall-makers: *N. vesicator*, in bean-shaped galls in the leaves; *N. ischnocerus*, in rather long galls, in pairs along the midribs of the leaves; *N. baccarum*, *N. salicis-cinereæ*, and *N. bellus*, in pea-shaped galls on the lower surface of the leaves of various Willows; *N. herbaceæ*, in similar galls on *Salix herbacea*; *N. gallicola*, in the bean-shaped galls so plentiful in leaves of *Salix alba* and other large Willows; and *N. Bridgmanni*, in similar galls from Sallows; *N. Vacciniellus* forms galls on *Vaccinium Vitis-idæa*. For methods of checking the ravages of such larvæ as feed exposed, *see* **Gooseberry and Currant Sawfly.**

NEMESIA (an old Greek name employed by Dioscorides to denote an allied plant). Ord. *Scrophularineæ*. A genus comprising about a score species of very pretty, South African, greenhouse, slender, annual or perennial, sometimes suffruticose, herbs. Flowers racemose at the tips of the branches, or rarely solitary in the axils; pedicels ebracteolate; corolla yellow, white, violet, or various-coloured. Leaves opposite. The few species in cultivation are treated as hardy annuals. Propagated by seeds, sown in early spring, in any ordinary soil. The seedlings should be thinned out when large enough to handle.

N. cynanchifolia (Cynanchum-leaved).* *fl.* rich lilac-blue, in terminal clusters. Summer. *l.* ovate-lanceolate, remotely toothed. Stems square. *h.* 1½ft. to 2ft. 1879. A pretty species. (G. C. n. s., xii. 136.)

N. floribunda (bundle-flowered).* *fl.* white and yellow, fragrant, racemose. Summer. *l.* at length petiolate; upper ones sessile. *h.* 1ft. A very charming plant. (B. R. 1838, 39.)

N. versicolor (various-coloured). *fl.* blue, lilac, or yellow and white; racemes few-flowered. Summer. *l.* at length petiolate, ovate; upper ones few, remote, sessile, oblong-lanceolate or linear, entire or dentate. *h.* 6in. to 12in.

NEMIA. A synonym of **Manulea** (which *see*).

NEMOPANTHES (from *nema*, a thread, and *anthos*, a flower; in allusion to the filiform peduncle). Mountain Holly. Syn. *Nuttallia*, of De Candolle. Ord. *Ilicineæ*. A monotypic genus, the species being a very glabrous, much-branched, hardy shrub, with ornamental berries. It thrives best, in cold damp soils, in somewhat shaded spots, and is most readily propagated by means of seeds.

N. canadense (Canadian). *fl.* small, polygamo-diœcious, on long and slender axillary peduncles, solitary or sparingly clustered; petals four or five, oblong-linear, spreading, distinct. May. *fr.* a light red drupe, with four or five bony nutlets. *l.* alternate, oblong, deciduous, entire or slightly toothed. *h.* 3ft. North America, 1802. Syns. *Ilex canadensis* and *Prinos integrifolius*. (A. F. B. ii. 503.)

NEMOPHILA (from *nemos*, a grove, and *phileo*, to love; alluding to the place of growth of the species). ORD. *Hydrophyllaceæ*. A genus comprising seven or eight species of hardy, diffuse, annual herbs, indigenous to North America. Flowers blue, white or spotted, showy

FIG. 669. NEMOPHILA INSIGNIS.

or small, terminal or opposite the leaves, on elongated, one-flowered peduncles, rarely shortly pedicellate, disposed in terminal few-flowered cymes; corolla broadly campanulate or sub-rotate; lobes five, broad, imbricated.

FIG. 670. FLOWERING BRANCH AND DETACHED BRANCHLET OF NEMOPHILA MACULATA.

Leaves alternate or opposite, pinnately lobed or dissected. The several species and varieties are of the easiest culture in any moderately good garden soil, and are admirably adapted for rockeries, borders, and beds. For a spring show, seeds should be sown early in August, where the plants are intended to flower; and, for summer display, any time during April.

Nemophila—*continued.*

N. atomaria (speckled). A synonym of *N. Menziesii*.

N. aurita (ear-leaved). *fl.* purple-violet, nearly 1in. in diameter. June. *l.* pinnate, hairy, produced at the base in two lateral ear-like lobes, which embrace the stem. *h.* 1½ft. 1831. (B. R. 1601; S. B. F. G. ser. ii. 338.)

N. insignis (remarkable).* *fl.* sky-blue, with a white eye, more than 1in. in diameter; peduncles longer than the leaves. Spring and summer. *l.* with three or four lobes on each side, quite entire, or cut. *h.* 1½ft. 1822. See Fig. 669. (B. M. 3485; B. R. 1713; S. B. F. G. ser. ii. 329.) The prettiest and best species, of which there are several varieties, including *alba*, white; *marginata*, blue, with a white edge; and *purpurea rosea*, purplish-rose.

N. maculata (spotted).* *fl.* white, with a violet-purple blotch on each lobe of the large corolla. Summer. *l.* very hairy, pinnatifid, with rounded, acute, or obtuse lobes. *h.* 6in. 1848. See Fig. 670. (F. d. S. 431.)

N. Menziesii (Menzies').* *fl.* white to light blue, commonly with dark dots or spots; peduncles axillary, elongated; corolla rotate, with a very pilose bottom. Summer. *l.* opposite, pinnatifid; lobes five to nine, almost entire. *h.* 4in. 1836. (B. M. 3774; B. R. 1940; S. B. F. G. ser. ii. 376, under name of *N. atomaria*.) There are a few pretty varieties of this species, such as *alba*, white and black centre; *cœlestis*, with sky-blue margin; and *oculata*, pale blue and black centre. *N. discoidalis* is a garden variety of this species, having rather smaller purple-brown flowers, edged with white.

N. phacelioides (Phacelia-like). *fl.* blue, with a white eye. Summer. *l.* more or less pinnatifid, broadest in the middle, and narrowed into a short petiole at the base. *h.* 1ft. 1822. (B. M. 2373; B. R. 740; S. B. F. G. 32.)

NEMOROSUS. Growing in groves.

NEMOSTYLIS. A synonym of **Nemastylis** (which *see*).

NENGA (said to be the Malay name of the plant). ORD. *Palmeæ*. A monotypic genus, the species being an elegant, unarmed, stove palm. It thrives best in a fibrous peat, to which a little leaf mould and sharp sand may be added with advantage. If well-drained, and not over-potted, it can scarcely be supplied with too much water. Propagated by imported seeds.

N. pumila (dwarf). *fl.* whitish; spadix shortly pedunculate; spathes two, lower one complete, lanceolate, complicate bicristate; upper one incomplete, persistent, or none. *fr.* reddish-yellow, small. *l.* terminal, equally pinnatisect; segments linear-acuminate or obliquely two or three-fid; margins reduplicate at base; primary nerves sparsely scaly underneath; rachis trigonous; petioles short. Stem slender, tall, annulate; branches slender, pendulous. Malay.

NENGELLA (a diminutive of *Nenga*). ORD. *Palmeæ*. A small genus (two or three species) of low, unarmed, stove palms, with reedlike, annulate stems, natives of the Malayan Archipelago and New Guinea. Flowers small, the females shorter than the males; complete spathes two, elongated, membranous, complanate, deciduous; spadix slender, pendulous, slightly flexuous; bracts and bracteoles scale-formed. Fruit small, elongated. Leaves terminal, equally pinnatisect or flabelliform and furcate; upper segments truncate, many-nerved, erose or cut; lower ones linear-lanceolate, long-acuminate; margins recurved at base; rachis and petiole trigonal. *N. paradoxa*, the only species in cultivation, requires a compost of loam and leaf soil, to which some sharp sand or charcoal should be added. As the plants become established, more loam should be added than when they were in a young state. Propagated by imported seeds.

N. paradoxa (paradoxical). *l.* 12in. to 18in. long, about 8in. broad; petiole with a long, striate, rusty-coloured sheath; blade pinnate; pinnules, 6in. to 8in. long, very unequal. Stem slender, 5ft. to 7ft. high; crown consisting of six or eight leaves.

NEOGYNE. Included under *Cœlogyne*.

NEOLEXIS. A synonym of **Smilacina** (which *see*).

NEOTTIA (from *neottia*, a bird's nest; referring to the interlacing of the numerous roots). Lady's Tresses. SYN. *Neottidium*. ORD. *Orchideæ*. A small genus of hardy terrestrial orchids, closely allied to *Listera*, but having a longer column, and generally a cucullate anther-bed. The three species known are leafless, brown-stemmed

Neottia—*continued.*

plants, with sheathing scales, natives of Europe and the Northern and mountainous regions of Asia. They are of little horticultural value. The undermentioned species is found generally in dark woods in many parts of England, Ireland, and Southern and Central Scotland.

N. Nidus-avis (bird's-nest). *fl.*, sepals broadly ovate, almost acute; petals more rounded; lip twice as long, deeply bilobed at the extremity; spike dense, 3in. to 4in. long. Spring and early summer. Stem 1ft. or more high, and, as well as the sheathing scales which replace the leaves, light brown. Roots a mass of succulent, stout, interlaced fibres. (Sy. En. B. 1478.)

NEOTTIDIUM. A synonym of **Neottia** (which *see*).

NEOTTOPTERIS. Included under **Asplenium** (which *see*).

NEPENTHACEÆ. A monotypic order of curious shrubs or sub-shrubs, inhabiting tropical Asia, Madagascar, the Seychelles, tropical Australia, New Caledonia, and especially the Malayan Archipelago. Flowers greenish (when dry, dark brown or purple), small, dicecious. Seeds at first floating, and imbibing the water; afterwards sinking to the bottom, where they germinate. "Leaves alternate; petiole winged at the base, the midrib prolonged at the top, and curved or spirally twisted, and terminating in a second foliaceous expansion, which is hollowed like an urn (the pitcher), to the opening of which is fitted a sort of lid, attached as by a hinge, and capable of being lowered or raised, so that the pitcher is sometimes closed, sometimes open. It is often found to contain a watery liquid before the raising of the lid" (Le Maoût and Decaisne). *Nepenthes*—the only genus—comprises upwards of thirty species.

NEPENTHES (an old Greek name of a plant used by Homer; the word means grief-assuaging, and is used in reference to supposed medicinal qualities). Pitcher-plant. SYN. *Phyllamphora.* The only genus of ORD. *Nepenthaceæ* (which *see* for characters). The species of this genus are not of difficult culture, provided they are kept in a moist atmosphere, where a temperature of from 70deg. to 80deg. is maintained during summer, and 65deg. in winter. They succeed best in a compost of two parts brown peat fibre and one of sphagnum. Nepenthes are most suitable for basket culture, and require an abundant supply of water in summer. Propagation may be effected by cuttings of well-ripened one-year-old shoots, plunged into a strong bottom heat; or by seeds, when procurable. The latter should be thinly sown in a seed-pan, filled to within 1in. of its rim with a compost similar to that already described, a little water being carefully sprinkled over the surface previous to sowing. The pan should then be placed in a moist, close frame, having a bottom heat of 80deg. to 85deg. Germination will ensue in about one month from the time of sowing. When several leaves appear, the seedlings should be transplanted into small pots.

N. albo-marginata (white-margined). *l.* narrow, 9in. to 12in. long. Pitchers light green below, reddish above, having a distinct white ring towards the mouth. Singapore, 1848. A very dwarf-growing species, admirably suited for basket culture. (G. C. 1849, 580; T. L. S. xxii. 73.)

N. ampullaria (bottle-like). *l.* broad, oblong, with somewhat ovate pitchers; terminal lid very small; colour a uniform light green. Borneo, &c., 1789. A robust-growing species. (B. M. 5109; F. d. S. 2325.)

N. a. picta (spotted). A variety having light green pitchers, streaked and spotted with reddish-brown.

N. a. vittata major (larger-striped). A form having relatively small flask-shaped pitchers, with two fringed wings and a small lid, the pitcher itself elegantly mottled with reddish blotches on a green ground. (I. H. 272.)

N. angustifolia (narrow-leaved). *l.* sub-coriaceous, sessile, amplexicaul, decurrent, narrowly lanceolate, acuminate, with the midrib prolonged into a long tendril. Pitchers green, spotted with red, 1¾in. to 2in. long, flask-shaped, distended at the base, gradually passing into an elongated, cylindrical neck; wings narrow, fringed; mouth obliquely ovate, sulcate-striate; lid glabrous, cordate, sub-orbicular, with a short, entire, pinnatisect spur at the base. Sarawak, 1881.

Nepenthes—*continued.*

N. atro-sanguinea (dark-blood-red).* *l.* stalked. Pitchers reddish-crimson, slightly spotted with yellow, about 6in. by 2½in., pointed at the base, distended at the lower half, cylindric above; wings broad, fringed; mouth ovate, acute, slightly prolonged towards the lid, and surrounded by a flattish rim, marked with close ridges, some red, others blackish; lid about the size of the mouth, oblong, emarginate, with a simple spur at the base. 1882. A handsome garden hybrid, probably a cross between *N. rubra* and *N. Sedeni.* (G. C. n. s., xvii. 827.)

N. bicalcarata (two-spurred).* *l.* of a peculiar dark green, obovate-lanceolate. Pitchers bag-shaped; covered when young with a fluffy rust-coloured down, and provided with two sharply-toothed wings when fully developed; neck thrown into ridges with intervening furrows, and prolonged at the back into an erect or slightly incurved process, terminating in the two recurved spurs, like the fangs of a snake with its head uplifted to strike. Borneo, 1878. (G. C. n. s., xiii. 201.)

FIG. 671. STEM OF NEPENTHES DISTILLATORIA.

N. chelsonii (Chelsea). A garden hybrid between *N. Dominiana* and *N. Hookeriana*, and having a habit intermediate between the two. It is well worth growing.

N. cincta (girded). *l.* approximate, 12in. by 3in., coriaceous, oblong-lanceolate, tapering to a broad dilated base, dark green; midrib somewhat angular on the lower surface. Pitchers green, flushed with red, and with numerous irregular purple blotches, tubular, slightly ventricose, rounded at base, 7in. to 8in. by 2½in.; rim very oblique, ¼in. broad, undulate, lobed, finely ribbed, with a narrow whitish band around the top of the tube; lower half thicker in texture than the upper; lid orbicular and two-ribbed, arching over the mouth of the pitcher. Stems cylindrical, stout. Borneo, 1884. (G. C. n. s., xxi. 110.)

N. coccinea (scarlet).* *l.* acute at apex. Pitchers crimson, slightly speckled with yellow, 6in. by 3in., flask shaped, pointed at the base, distended below the middle, broadly cylindric above; wings deeply fringed; mouth ovate, acute, slightly protracted at the back; rim broad, finely ribbed, the ribs parti-coloured red and black; throat greenish, speckled with red; lid ovate-oblong,

Nepenthes—*continued.*

smaller than the mouth, greenish, striped and speckled with red. 1882. A hybrid of American origin. (G. C. n. s., xviii. 29.)

N. Courtii (Court's).* *l.* dark green, coriaceous, lanceolate, acute at the apex, tapering towards the base, which expands to clasp the stem. Pitchers dull greyish-green, spotted with red, about 5in. by 2½in., distended at the base, cylindrical above the middle, with deep, sharply laciniate wings, equal in width all the way down; mouth ovate, finely and evenly ribbed; lid somewhat convex-ovate, smaller than the mouth, and with a single spur at the back. 1881. A remarkably handsome hybrid, raised by Mr. Court at Messrs. Veitch's. (G. C. n. s., xvi. 845.)

N. distillatoria (distilling). *l.* bright light green. Pitchers 6in. to 8in. long. Ceylon, 1789. A very desirable species, of free growth, and requiring less heat than any other. See Fig. 671. A variety named *rubra* is very distinct and ornamental, having deep blood-red pitchers.

N. distillatoria (distilling), of Graham. A synonym of *N. Khasiana*.

N. Dominiana (Dominy's). *l.* dark green, coriaceous, broad, oblong. Pitchers deep green, and slightly spotted, several inches in height. A handsome garden hybrid, of robust growth.

N. Dormanniana (Dormann's).* *l.* broadly lanceolate, acute at the apex, finely ciliate at the edges. Pitchers green, heavily spotted with deep red blotches, nearly 6in. by 3in., flask-shaped, pointed at the base, distended below the middle, tapering upwards into a broad tube, the rim of which is broad, finely ribbed, and slightly oblique; wings deep, fringed at the edges, and rounded at the base; lid broadly ovate, with a simple spur at the base. A fine hybrid, probably of American origin. (G. C. n. s., xvii. 525.)

N. hirsuta glabrescens (hairy-glabrescent). *l.* sub-amplexicaul, broad at the base, lanceolate. Pitchers 5in. by 1¾in., elongate, cylindrical, slightly dilated at the base, reddish, with conspicuous veins, or wholly green; wings deep fringed; mouth ovate, slightly prolonged at the back, surrounded by a greenish-yellow, finely-ribbed rim; lid about the size of the mouth, cordate, emarginate, with a simple spur. Borneo. (G. C. n. s., xvii. 399.)

N. Hookeriana (Hooker's).* *l.* coriaceous, nearly glabrous, acute at both ends. Pitchers spotted with red; sub-globose, or sometimes elongated, with a flattish, finely-ribbed margin surrounding the ovate mouth, and scarcely prolonged at the back; wings very deep, broad, rounded at both ends, and sharply laciniate at the margin; lid flat, obovate, emarginate, with a simple spur at the base. Sarawak, 1847. A very handsome plant, closely related to *N. Rafflesiana*, from which it differs in its short petiole, its venation, but more especially in the flatter (not hood-like) lid, and in the absence of the long process supporting it, which is so marked a feature of the latter. (G. C. n. s., xvi. 813.)

N. hybrida (hybrid). *l.* deep green, oblong, broad. Pitchers dark green, about 8in. long, winged and ciliated in front. A garden hybrid. The variety *maculata* resembles the type in general appearance; but the pitchers, which are about 10in. long, are profusely streaked with reddish-purple upon a dark green ground.

N. intermedia (intermediate).* *l.* coriaceous, tapering to both ends. Pitchers green, spotted with red, about 6in. by 2½in., somewhat cylindrical, pointed at the base, slightly swollen in the middle; wings broad, rounded at the base, fringed; mouth obliquely ovate, prolonged at the back into a column supporting the lid, which is ovate-obtuse, slightly hooded. 1882. A handsome hybrid. (G. C. n. s., xvii. 179.)

FIG. 672. LEAF AND PITCHER OF NEPENTHES MADAGASCARIENSIS.

Nepenthes—*continued.*

N. Kennedyana (Kennedy's). *l.* oblong-lanceolate, very acute, tapering at the base into a broadish, stem-clasping stalk. Pitchers reddish, over 5in. long by 1½in. wide, elongate-cylindrical, slightly dilated below the middle, tapering at the base, and with deep, sharply-fringed wings; mouth oblique, surrounded by a narrow, finely-ribbed rim; throat glaucous-violet; lid sub-

Nepenthes—*continued.*

orbicular, as large as the mouth, and with a simple spur at the base. Cape York, North Australia, 1882. (G. C. n. s., xvii. 257.)

FIG. 673. LEAF AND PITCHER OF NEPENTHES NORTHIANA.

N. Khasiana (Khasian).* *fl.* green, yellow, dioecious, in a solitary raceme. *l.* entire, channelled, undulated, glabrous, 1ft. to 1½ft. long, including the petiole. Pitchers green, with purplish

Nepenthes—*continued.*

markings, 6½in. long, 4½in. in circumference, wedge-shaped behind when young; lid 2½in. by 2in. *h.* 6ft. China, 1789. (B. M. 2798, under name of *N. distillatoria*.)

N. lanata (woolly). *l.* deep green, glabrous above, paler, and thinly covered with blackish hairs beneath, coriaceous, oblong-obtuse, 1ft. or more long, gradually tapering at the base into a broad leafstalk. Pitchers greenish, about 6in. by 1½in., cylindrical, winged on the posterior side next the axis of the plant; wings toothed and fringed; mouth ovate, acute, prolonged anteriorly into a triangular neck; lid oblong or sub-orbicular, glandular on the under surface. Borneo, 1876. According to the "Gardeners' Chronicle," there has been a good deal of confusion as to the true *Nepenthes Veitchii*, which, however, is well figured by Sir Joseph Hooker, in his monograph, in the "Linnæan Transactions." Among other plants misnamed *N. Veitchii*, the subject of this note must be included. By some oversight, the plate in the "Illustration Horticole" [1876, 261] bears the name of *N. lanata*, while the accompanying text is headed *N. Veitchii*, and the description given applies to that species.

N. Lawrenciana (Lawrence's).* Pitchers pale green, spotted profusely with dark crimson, 4in. long. 1880. A very distinct hybrid, between *N. Phyllamphora* and *N. Hookeriana*; it is of very compact growth, and the edges of its leaves are slightly serrated. (G. C. n. s., xiv. 40.)

N. madagascariensis (Madagascar).* *l.* coriaceous, oblong, gradually tapering at the base into a short, broad, amplexicaul stalk, and narrowing gradually into an acute lance-shaped point, terminating in a pitcher-bearing tendril. Pitcher crimson, 2¼in. long, 1in. wide, thinly hairy, flask-shaped, with two membranous fringed wings in front; mouth nearly circular, surrounded by a narrow, closely-ribbed border, the throat of a pale cream-colour; lid transversely oblong, or somewhat kidney-shaped, obtuse at both ends, contracted in the middle, and with a small, simple, or laciniate spur at the back. Madagascar, 1881. A very handsome species. See Fig. 672 (for which we are indebted to Messrs. Veitch and Sons).

N. Mastersiana (Dr. Masters').* *l.* sessile, coriaceous, oblong-ovate, acute, reddish at the margins, auriculate-amplexicaul at the base; midrib depressed above, prominent beneath. Pitcher deep claret-red, 4½in. by 1¼in., thinly hairy, here and there purple-spotted, cylindrical, somewhat ventricose, slightly contracted above the middle; wings deep, sharply and irregularly toothed at the margin; mouth rounded, surrounded by a clear, shining red, closely-ribbed margin; throat pinky cream, with red spots; lid about the size of the mouth, sub-orbicular, convex. A hybrid, raised at Messrs. Veitch and Sons', between *N. Khasiana* and *N. sanguinea*. (G. C. n. s., xvi. 749; xxi. 248, 249.)

FIG. 674. NEPENTHES PHYLLAMPHORA, showing Habit, detached Portion of Inflorescence, and Pitcher.

N. Morganiæ (Mrs. Morgan's).* *l.* pale green, with red midribs, smooth. Pitchers beautifully mottled with bright red and pale green when young, almost self-coloured and blood-red in an adult stage, flask-shaped, 6in. to 8in. long, with two narrow ciliolate wings; lid always pale green. 1851. A beautiful hybrid, of dwarf, neat habit.

N. Northiana (Miss North's).* *l.* coriaceous, oblong-ovate, acute, tapering at the base into a short, broad, amplexicaul stalk. Pitchers purple-spotted, nearly 1ft. long, and 5½in. wide, sub-coriaceous or membranous, elongate, cylindric, slightly curved, with two membranous dentate-fimbriate wings; mouth elliptic, elongated, very oblique, 4in. by 1½in., and surrounded by a broad, everted, closely and finely-ribbed margin or peristome; lid ovate-oblong, smooth, shiny on the inner surface, where it is sprinkled with small black dots. Borneo, 1881. A very beautiful and not

Nepenthes—*continued.*

species. See Fig. 673 (for which we are indebted to Messrs. Veitch and Sons). (G. C. n. s., xvi. 717.)

N. Outramiana (Outram's). *l.* shortly stalked, ovate, tapering to both ends. Pitchers 5in. long, of fine form, broad at the base, tapering into a cylindrical neck, pale yellowish-green, densely spotted with small dark blood-red spots, which in some instances coalesce and nearly cover the entire surface, while the interior and the mouth are also well marked. 1880. A handsome hybrid between *N. Sedeni* and *N. Hookeriana*, of very free growth. (F. M. n. s., 384.)

N. Phyllamphora (pitcher-leaved). *l.* bright green, large, broad, oblong. Pitchers the same colour as the leaves, 5in. to 10in. long, not winged, but furnished with a few hairs in front. Borneo, &c. A very handsome and free-growing species, with a somewhat robust habit. See Fig. 674. (B. M. 2629.)

FIG. 675. NEPENTHES RAFFLESIANA.

N. Rafflesiana (Sir Stamford Raffles').* *fl.* yellow and brown; racemes at first terminal, eventually lateral, opposite a leaf. September. *l.* alternate, petiolate, the lower ones crowded and lanceolate, the upper ones more remote and oblong. Pitchers greenish-yellow, with brown markings, very handsome; remarkable for the very long process supporting the lid. Singapore, 1815. See Fig. 675. (B. M. 4285; F. d. S. 213, 214; G. C. n. s., ix. 177.)

N. R. insignis (remarkable). *l.* 18in. by 3in., with short, deeply-channelled leafstalks. Pitchers green, mottled purplish-brown, thickly beset with brownish hairs, 9in. long by 4in. wide, obliquely flask-shaped, the rim deeply and evenly ribbed. 1882. (G. C. n. s., xviii. 69.)

N. R. nigro-purpurea (dark purple). *l.* leathery, glabrescent, acute at both ends, with rather long channelled stalks. Pitchers dull purplish-brown, with a few paler spots, and a few brownish star-like hairs, 6½in. long by 2in. wide, distended; wings incurved, toothed; rim consisting of numerous closely-set ribs; lid 2in. by 1¾in. 1882. A distinct variety. (G. C. n. s., xviii. 70.)

N. Rajah (Rajah.)* *l.* coriaceous, oblong, tapering at the base into a conduplicate channelled-leaved stalk; apex rounded, tendril given off from the under surface a short distance below the apex. Pitchers dull purple, over 1ft. long, slightly hairy, broadly

Nepenthes—*continued.*

cylindrical or slightly saccate, somewhat dilated at the base, ribbed; ribs slightly fringed; mouth very broad, oval, purplish, closely ribbed, ribs ending in sharp comb-like points; lid sub-orbicular, spurred at the back. Borneo, 1881. A noble species. (G. C. n. s., xvi. 493.)

N. Ratcliffiana (Ratcliff's).* *l.* light green, linear-lanceolate, acute at both ends, 12in. to 15in. long, 1½in. wide. Pitchers green, spotted with red, 5in. to 6in. by 2in., flask-shaped; wings ciliate, broad or shallow, narrow at the base; mouth oblique, surrounded by a ribbed parti-coloured rim; lid about the size of the mouth, ovate, glandular on the inner surface, and with a simple spur at the base. An attractive hybrid, said to have been raised between *N. Hookeriana* and *N. Phyllamphora*. (G. C. n. s., xvii. 178.)

N. robusta (robust). A very free-growing hybrid, the result of a cross between *N. Hookeriana* and *N. Phyllamphora*, with pitchers intermediate in character between the two, but having the colour and markings of *N. Hookeriana*. The pitcher in this variety has a somewhat pear-shaped appearance. 1880.

N. rubra (red). Pitchers bright red, very large. Ceylon, 1868. A distinct and beautiful species, of slender habit, and very rare in cultivation.

N. rubro-maculata (red-spotted).* *l.* very dark green, partly amplexicaul, 12in. long, 2in. wide, rounded at the apex, coriaceous. Pitcher yellowish-green, spotted with claret-red, 5in. to 6in. long, 1⅜in. wide, cylindrical, slightly distended at the base, deeply winged; wings fringed; mouth oblique, surrounded by a broad, flat rim, the ridges of which are deep red; lid much smaller than the mouth, ovate, red-spotted, glandular on the inner surface. A hybrid, raised by Messrs. Veitch in 1882. (G. C. n. s., xvii. 143.)

N. sanguinea (blood-red).* *l.* dark green. Pitchers of a deep blood-red, 5in. to 10in. long. East Indies. A beautiful but extremely rare species. (G. C. n. s., xi. 13.)

N. sanguinea (blood-red), of gardens. A synonym of *N. Veitchii*.

N. Sedeni (Seden's).* Pitchers light green, profusely blotched and freckled with brownish-crimson, medium-sized. A very desirable garden hybrid, obtained from seed, *N. distillatoria* being one of the parents, and whose habit it seems to bear. It produces pitchers very freely.

N. superba (superb). A hybrid, resembling *N. Hookeriana* in habit, but its pitchers are intermediate between those of that species and of *N. Sedeni*. 1881. (F. M. 434.)

N. Veitchii (Veitch's).* *l.* coriaceous, obovate-lanceolate, tapering at the base. Pitchers about 12in. long, somewhat cylindrical, narrowed at the base, with two deep, sharply-laciniate wings, the laciniæ themselves somewhat acutely lobed; mouth surrounded by a very broad everted border, strongly ribbed, the ribs ending in sharp teeth, which point downward; lid very small relatively to the mouth, oblong, keeled at the base. Borneo. A very handsome species. (B. M. 5080, under name of *N. villosa*; G. C. n. s., xvi. 781, and xviii. 809, under name of *N. sanguinea*.)

N. villosa (hairy). *l.* dark ferruginous-green, broad, somewhat spathulate. Pitchers dull green, faintly blotched with reddish-brown, 10in. to 12in. long, winged in front, the wings deeply lacerated at the edges; the annular disk of the mouth is very broad, and reddish-pink; lid small, rusty green, blotched with reddish-brown. Borneo, 1855. A species rarely seen in cultivation.

N. villosa (hairy), of "Botanical Magazine." A synonym of *N. Veitchii*.

N. Williamsii (Williams').* This handsome form is a hybrid from *N. Sedeni* and *N. Hookeriana*, having the pitchers intermediate in shape between those of the two parents, these being 4in. to 5in. long, densely spotted with blood-red, the red in many cases predominating, while the interior is marked with the same colour; the under side of the lid is reddish-brown. 1880. (G. C. n. s., xiv. 40.)

N. Wrigleyana (Wrigley's). *l.* light green, 10in. to 12in. long, 1¾in. to 2in. wide, acute at both ends, glandular beneath. Pitchers pale green, with crimson spots, flask-shaped, with a thick cylindrical neck; wings narrow, ciliate; mouth oblique, ribbed; ribs all green; lid broadly oval, smaller than the mouth, glandular on the inner surface, and with a simple spur. A hybrid. 1882. (G. C. n. s., xvii. 143.)

NEPETA (an old Latin name used by Pliny, and probably derived from the town of Nepi, in Italy). Catmint. Including *Glechoma*. SYNS. *Cataria*, *Saussuria*. ORD. *Labiatæ*. A large genus (about 120 species) of hardy herbaceous plants, sometimes tall and erect, sometimes diffuse, perennial or annual, low or dwarf, broadly dispersed over the extra-tropical regions of the Northern hemisphere; a few extend between the tropics, and one species has been introduced to North America or South Africa. Corolla often blue or white, rarely yellow; tube slender at base, included or exserted; whorls often many-flowered, but varying. Leaves toothed or incised. The few species which are worth growing are of the easiest

Nepeta—*continued.*

culture, in any ordinary light sandy soil. Propagated by division of the plants, or by sowing seeds, in spring. All the species here described are perennials.

N. Glechoma (Glechoma). Ground Ivy. *fl.* blue, in axillary whorls of about six. April. *l.* reniform, crenate, stalked. Stems procumbent, frequently several feet long, creeping. Europe (Britain). A handsome plant, but too common to be of horticultural value. SYN. *Glechoma hederacea*. (Sy. En. B. 1055.) There is a form with variegated leaves.

N. Kokamirica (Kokamyran). *fl.* blue, in dense terminal spikes; lower lip of corolla reniform, emarginate. *l.* small, opposite, ovate-elliptic, crenately toothed. Kokamyr, 1879. (R. G. 1030.)

N. Mussini (Mussin's). *fl.* pale blue, verticillate; corolla tube longer than calyx, filiform, curved; throat compressed, funnel-shaped; upper lip divided almost to the base; lower lip large, crenate, hollow, spotted with white towards the throat; anthers purple, bilobed. May. *l.* cordate, oblong-oval, crenate, rugose, hoary beneath; lower ones on rather long petioles, upper ones sub-sessile. Stem divided at the base; branches long, weak, generally undivided, square, with obtuse angles. Caucasus. (B. M. 923.)

N. spicata (spike-flowered). *fl.* in terminal, sessile, or peduncled spikes, 2in. to 4in. long; corolla purple, with the lower lip nearly white. September. *l.* 1in. to 4in. long, broadly ovate-cordate, deeply serrate or toothed. *h.* 6in. to 12in. Western Himalayas, 1878. (B. M. 6405.)

NEPHELAPHYLLUM (from *nephele*, a cloud, and *phyllon*, a leaf; referring to the marks upon the leaves). ORD. *Orchideæ*. A small genus (four species) of creeping, stove, terrestrial orchids, natives of the East Indies, Southern China, and the Malayan Archipelago. Flowers loose or densely racemose, on leafless scapes. Leaves stalked, ovate-lanceolate or cordate, usually purplish beneath, spotted or clouded above. The species thrive in a mixture of peat, fibre, and sphagnum, amongst which a few pieces of porous sandstone and charcoal may with advantage be placed. Generally speaking, they require somewhat similar treatment to *Anœctochilus*. The two species here given are probably the only ones yet introduced.

N. pulchrum (beautiful). *fl.* green, small, with a white lip. *l.* beautifully mottled with dark green. *h.* 3in. Java, 1860. (B. M. 5332.)

N. scapigerum (scape-bearing). *fl.* very pretty; lip white at the base, spotted with purple-brown in the middle and yellow at the tip. *l.* plain. *h.* 4in. to 6in. Borneo, 1863. A very desirable plant. (B. M. 5390.)

NEPHELIUM (an ancient name for Burdock, and applied to this genus on account of the rough fruits, which somewhat resemble those of Burdock). SYNS. *Dimocarpus* (in part), *Euphoria* (in part). ORD. *Sapindaceæ*. This genus comprises about a score species of handsome stove, evergreen trees, natives of the West Indies, the Indian Archipelago, and Australia. Flowers small, in axillary and terminal many-flowered panicles. Fruit globose or ovoid, smooth, or tubercled or warted, often edible. Leaves alternate, exstipulate, abruptly pinnate; leaflets entire or rarely serrate, in one species stipule-like. The species (of which the two here described are, in all probability, the only ones introduced) thrive in a good, well-drained, turfy loam, and, during the season of growth, like an occasional watering with liquid manure. Propagated by seeds, or by cuttings made of half-ripened wood.

N. Lit-chi (Lee Chee). *fl.* white, racemose, loose, forming a panicle. May. *fr.* a berry, cordate, scaly, disposed in loose racemes, red on one side and green on the other, containing a delicious white, sweet, sub-acid pulp, and a large seed. *l.*, leaflets three or four pairs, tapering to both ends, lanceolate, glaucous beneath. South China, 1786, widely cultivated in the tropics.

N. Longana (Longan). *fl.* white, in loose panicles. May. *fr.*, berries globose, almost smooth, with a yellowish, smooth skin; pulp white, tart, and juicy. *l.*, leaflets three pairs. *h.* 20ft. India, &c., 1786, cultivated in the tropics. (B. M. 4096.) This species is regarded by Bentham and Hooker as the type of the genus *Euphoria*.

N. verticillatum (whorled). A synonym of *Sapindus Danura*.

NEPHRANDRA. A synonym of **Vitex** (which *see*).

NEPHRANTHERA. A synonym of **Renanthera** (which *see*).

NEPHRODIUM (from *nephros*, a kidney; referring to the shape of the spore-cases). ORD. *Filices.* Including *Arthropteris* (in part), *Camptodium*, *Dryopteris*, *Lastrea*, *Pleocnemia*, and *Sagenia*. A very large genus (about 300 species) of stove, greenhouse, or hardy ferns, widely distributed, and including species which vary considerably in size, texture, cutting, and venation. Sori sub-globose, dorsal or terminal on the veinlets; involucre cordate-reniform, attached by the sinus. Generally speaking, Nephrodiums are of very easy cultivation, the stronger growing kinds thriving best in good loam, and the weaker ones in loam, leaf mould, and sand, or peat and loam. Several species are most desirable subjects for Wardian cases and for planting in the cool fernery. For general culture, &c., *see* **Ferns.** Except where otherwise stated, stove treatment is required.

N. abortivum (abortive). *sti.* tufted, 6in. to 12in. long, firm, erect. *fronds* 1ft. to 2ft. long, 6in. to 8in. broad; central pinnæ 3in. to 4in. long, §in. to ⅝in. broad, cut about one-third of the way down into close, entire, truncate lobes, ⅛in. broad; lower pinnæ distant, and reduced suddenly to mere auricles. *sori* medial. Penang, Java, and Ceylon.

N. abruptum (abrupt). A synonym of *N. truncatum.*

N. æmulum (rivalling).* Hay-scented Buckler Fern. *sti.* tufted, 1ft. long, densely scaly below. *fronds* lanceolate-deltoid, 1ft. to 1½ft. long, 6in. to 10in. broad, the lowest pinnæ much the largest; lowest pinnules larger than the others, which are ovate-lanceolate, cut down to the rachis below into deeply pinnatifid lobes, with aristate teeth; under surface glandular. Involucre not gland-ciliated. Britain, Madeira, and Azores. A handsome hardy species, smelling like hay when dried. SYNS. *N. fœnisecii* and *Lastrea recurva.*

N. albo-punctatum (white-spotted). *rhiz.* wide-creeping, scandent, scaly or naked. *sti.* naked, jointed. *fronds* 9in. to 12in. long, 4in. to 6in. broad; pinnæ spreading, 2in. to 3in. long, ½in. broad, cut half down to the rachis or more into oblong, blunt, entires lobes. *sori* terminal on the veinlets, near the edge. Guinea, Natal, Fiji, &c. A very pretty and distinct species. SYN. *Arthropteris albo-punctata.*

N. amboinense (Amboynan). *sti.* tufted, 6in. to 8in. long, nearly naked. *fronds* 2ft. or more long, 8in. to 12in. broad; pinnæ spreading, 3in. to 4in. long, ½in. to §in. broad, cut about a quarter down into bluntish, slightly falcate lobes; lower pinnæ shorter, and deflexed. *sori* in rows close to the midrib; capsules naked. Philippines, &c.

N. Arbuscula (little tree).* *sti.* tufted, 4in. to 8in. long. *fronds* 1ft. to 1½ft. long, 6in. to 8in. broad; pinnæ close, numerous, 3in. to 4in. long, §in. to ½in. broad, cut a quarter or less down into blunt lobes, several of the lower pairs short and distant. *sori* in close rows. Mascarene Islands, Ceylon, &c. SYN. *N. Hookeri.*

N. aristatum (awned). A synonym of *N. Otaria.*

N. articulatum (jointed). A synonym of *N. pennigerum.*

N. catopteron (downwards-winged).* *sti.* 3ft. to 4ft. long, pubescent. *fronds* 4ft. to 6ft. long, 2ft. to 3ft. broad; lower pinnæ 1ft. to 1½ft. long, oblong-lanceolate, with close, lanceolate pinnules, or sub-deltoid, with some of the pinnules of the lower side compound; segments oblong, bluntish, about ½in. long, ¼in. broad, more or less deeply pinnatifid. *sori* copious; involucre firm. Cape Colony, &c. Greenhouse.

N. chrysolobum (golden-lobed). *sti.* tufted, 4in. to 6in. long, slender, villose, scaly below. *fronds* 6in. to 9in. long, 3in. to 4in. broad; pinnæ 1½in. to 2in. long, §in. broad, cut down nearly to the rachis into close, blunt, entire lobes, ⅛in. broad, the lowest pair deflexed and slightly stalked. *sori* near the apex. Brazil, &c., 1840. A very pretty species, but rarely seen in cultivation. SYN. *Lastrea chrysoloba.*

N. cicutarium (Cicuta-like).* *sti.* 1ft. or more long. *fronds* 1ft. to 2ft. long, sub-deltoid, the apex deeply pinnated, with sinuated lanceolate lobes; below this, three to six pinnæ on each side, the lowest sub-deltoid, deeply pinnatifid or pinnate below. *sori* rather large, in two rows near the main veins, on connected or free veinlets. Tropics of both hemispheres. SYN. *Sagenia cicutaria.*

N. cuspidatum (pointed).* *sti.* 1ft. or more long, naked, densely scaly at the base. *fronds* 2ft. to 3ft. long, 8in. to 12in. broad; pinnæ 4in. to 6in. long, ½in. broad, the edge sharply inciso-serrated to a depth of from half to one line; involucre fugacious. North India, Ceylon.

N. cyatheoides (Cyathea-like).* *sti.* 1ft. to 2ft. long, naked. *fronds* 2ft to 3ft. long, 1ft. or more broad; pinnæ close, spreading, 4in. to 6in. long, ¾in. to 1in. broad, the apex acuminate, the edge irregular, furnished with acute forward-pointing teeth to a depth of one or two lines, the lowest pair not shorter than the next. *sori* usually one on each veinlet, close to the main vein. Sandwich Islands and Sumatra. A very handsome but rare greenhouse species. (H. S. F. iv. 241A.)

Nephrodium—*continued.*

N. decompositum (decompound).* *rhiz.* wide-creeping. *sti.* 1ft. to 1½ft. long, scaly at base. *fronds* 1ft. to 2ft. long, 1ft. or more broad, ovate-lanceolate or deltoid; lower pinnæ much the largest, deltoid, 4in. to 9in. long, 2in. to 4in. broad; pinnules lanceolate, more or less deeply pinnatifid; segments unequal-sided, ovate-rhomboidal, deeply pinnatifid, with toothed lobes. *sori* rather large, placed midway between the midrib and edge. Australia to Fiji, 1825. A handsome greenhouse species. SYN. *Lastrea decomposita.*

N. d. glabellum (smoothish). *fronds* more finely cut than in the type, with more copious spinulose teeth, villose only on the rachis above, the surfaces glossy, and lobes not imbricated. A very desirable greenhouse form, having an abbreviated rhizome. SYN. *Lastrea glabella.*

N. decurrens (decurrent). *rhiz.* creeping. *sti.* narrowly winged, often nearly or quite to the base. *fronds* 2ft. to 4ft. long, 1ft. or more broad, cut down to a winged rachis into from four to eight pairs of sinuated linear-oblong pinnæ, 6in. to 12in. long, 1in. to 2in. broad, the lowest sometimes forked. *sori* large, in two regular rows between the principal veins. Tropical Asia, &c. SYN. *Sagenia decurrens.*

N. decursivo-pinnatum (decursive-pinnate).* *sti.* tufted, 3in. to 4in. long, scaly. *fronds* 1ft. or more long, 3in. to 4in. broad; pinnæ linear, 1in. to 2in. long, ¼in. broad, the edge more or less pinnatifid, the bases connected by a broad lobed wing, the lower one gradually reduced and sometimes distinct; involucre minute, fugacious. Japan, &c. Hardy.

N. deltoideum (deltoid).* *sti.* tufted, 3in. to 6in. long, densely scaly. *fronds* 1ft. to 2ft. long, 4in. to 8in. broad; pinnæ of the lower third or quarter suddenly dwarfed, the larger ones 2in. to 4in. long, ¾in. to 1in. broad, cut two-thirds of the way down into close entire lobes, two lines broad. *sori* nearer the edge than the midrib; involucre very fugacious. West Indies. A singular and beautiful species. SYN. *Lastrea deltoidea.*

N. dissectum (dissected). *sti.* tufted, 1ft. or more long, rather slender. *fronds* 1ft. to 5ft. long, 1ft. to 3ft. broad, deltoid; lower pinnæ varying from simply pinnatifid, with broad, blunt lobes, to 1ft. long, with similar pinnatifid pinnules, the centre usually uncut for a breadth of ¼in. to ½in., and the uncut bluntish or acute ultimate divisions as broad. *sori* copious, generally submarginal. India, Ceylon, to Madagascar. SYNS. *N. membranifolium*, *Lastrea dissecta.*

N. eriocarpum (woolly-spored). A synonym of *N. odoratum.*

N. erythrosorum (red-sorused).* *sti.* tufted, 6in. to 9in. long, more or less densely scaly. *fronds* 1ft. to 1½ft. long, 8in. to 12in. broad, ovate-lanceolate; pinnæ lanceolate, the lowest the largest, 5in. to 6in. long, 1½in. broad, cut down to the rachis below into oblong bluntish pinnules, 2in. or 3in. broad, the edge slightly, sometimes spinosely, toothed. *sori* in rows of six to nine to a pinnule, near the midrib; involucre half a line broad, flat, bright red when young. Japan and China. Hardy. SYN. *Lastrea erythrosora.* (H. S. F. iv. 253.)

N. eusorum (large-sorused). A synonym of *N. truncatum.*

N. extensum (extensive). *sti.* 1ft. to 2ft. long. *fronds* 2ft. to 4ft. long, 1ft. to 1½ft. broad; pinnæ 6in. to 9in. long, §in. to ¾in. broad, cut about two-thirds down to the rachis into linear-oblong lobes; lower pinnæ scarcely shorter than the rest. *sori* in rows, nearly terminal in the veins, and not confined to the lobes. Ceylon, Philippines, &c.

N. Filix-mas. Male Fern.* *sti.* tufted, 6in. or more long, more or less densely scaly. *fronds* 2ft. to 3ft. long, 8in. to 12in. broad; pinnæ lanceolate, 4in. to 6in. long, ¾in. to 1¼in. broad, cut down very nearly to the rachis into close, blunt, regular, sub-entire lobes, one and a-half to two lines broad, lower ones rather shorter than the others; involucre large, convex. Cosmopolitan. SYN. *Lastrea Filix-mas.* Of this very widely-distributed hardy species, the following are the more important varieties.

N. F.-m. abbreviatum cristatum (short-crested). A charming miniature form, growing from 10in. to 1½ft. high, with distant and crested pinnæ.

N. F.-m. acrocladon (branch-tipped). An elegant and distinct form, with fronds 1¾ft. or more long, ovate-lanceolate, deep rich green, and having the apex of each pinnæ, as well as the top of the frond, profusely crested.

N. F.-m. Bollandiæ (Mrs. Bolland's). A handsome and distinct form, the fronds of which are from 1ft. to 1¾ft. long, 8in. or 9in. wide, thin, and remarkable for their width and undulate appearance.

N. F.-m. crispa (curled). A pretty variety for the Wardian case, having fronds about 9in. long, ovate-lanceolate, with the pinnæ and pinnules crowded and imbricate.

N. F.-m. cristatum (crested).* A handsome variety, having fronds about 2ft. long and 10in. broad, frequently, however, exceeding these dimensions; pinnæ shorter and narrower than in the type; apex of frond and each pinna beautifully tasselled or crested. There is a most desirable form of this variety known as *angustatum*, in which the fronds are only about 2½in. wide.

N. F.-m. furcans (forked). A fine and robust-growing variety, with fronds nearly 2ft. long, and the apex of each pinna forked.

Nephrodium—*continued.*

N. F.-m. grandiceps (large-crested). A lovely plant, having fronds the same length and breadth as the type, but with the apex densely racemose and crested; pinnules frequently forked.

N. F.-m. Pinderi (Pinder's). A well-marked variety, with linear-lanceolate, erect, fronds, which are from 2ft. to 3ft. in length.

N. F.-m. polydactyla (many-fingered). A handsome and graceful plant, with fronds from 1ft. to 2ft. long, having the apex of each pinna, and also of the frond, terminated by a very pretty tuft or crest.

N. F.-m. pumila (dwarf). An elegant little variety, with rich dark green fronds, and pinnatifid, obtuse pinnæ. A pretty plant for Wardian cases.

N. F.-m. Schofieldii (Schofield's). A rare and pretty little variety, having fronds 4in. long and ¼in. broad, and with forked or crested apices.

N. floridanum (Floridan).* *sti.* 6in. or more long, with a few scales. *fronds* 1½ft. to 2ft. long, 6in. to 8in. broad, oblong-lanceolate; fertile pinnæ confined to the upper half, close, lanceolate, 3in. to 4in. long, 1in. to 1¼in. broad, cut down to a narrowly-winged rachis into oblong, slightly crenated, blunt pinnules, with their own breadth between them, and two rows of sori reaching from the midrib nearly to the edge; barren pinnæ broader, the lower ones rather reduced, and sub-deltoid, all not so deeply cut, and the pinnules close. South United States. Hardy.

N. fœnisecii (haymaking-time). A synonym of *N. æmulum.*

N. fragrans (fragrant).* *sti.* densely tufted, very short, scaly. *fronds* 6in. to 9in. long, 1½in. to 2in. broad, oblong-lanceolate; pinnæ ¾in. long, ¼in. to ⅜in. broad, cut down nearly to the rachis below into oblong lobes, which are again toothed or pinnatifid; lower pinnæ reduced gradually. *sori* in the lower part of the pinnules; involucre very large and membranous. Caucasus and Arctic America, &c., 1820. Hardy. See Fig 676.

N. funestum (deadly). A synonym of *N. subquinquefidum.*

N. glandulosum (glandular).* *sti.* smooth, but slightly scaly when young. *fronds* glabrous, pinnate, 2ft. to 3ft. long; pinnæ distant, ovate-lanceolate, shortly petiolate, sub-cordate at base, and crenate at margin; lower ones almost opposite, upper ones alternate. *sori* small, reniform. India, &c.

N. Goldieanum (Goldie's).* *sti.* tufted, 1ft. long, scaly below. *fronds* 2ft. to 3ft. long, 1ft. or more broad, ovate-deltoid; lower pinnæ 6in. to 9in. long, 2in. broad, cut down nearly to the rachis into linear-lanceolate, sub-falcate, slightly-toothed lobes. *sori* in rows near the midrib. North America. Hardy.

N. hirsutum (hairy), of Don. A synonym of *N. odoratum.*

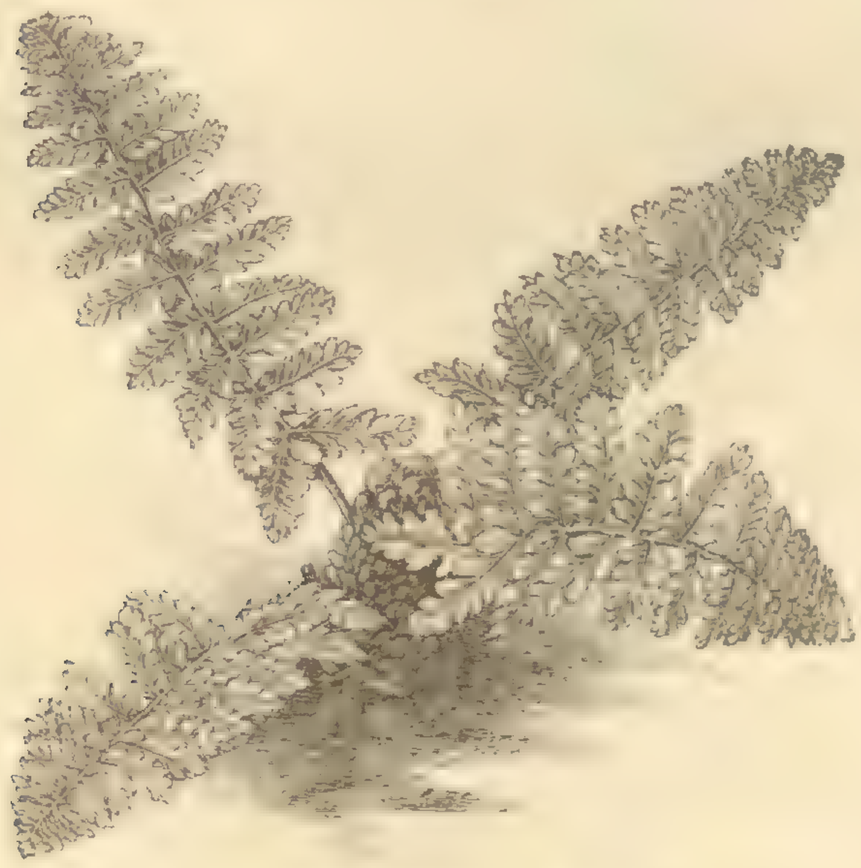

FIG. 676. NEPHRODIUM FRAGRANS.

N. hirtipes (hairy-stalked). *sti.* tufted, 1ft. or more long, densely scaly. *fronds* 2ft. to 3ft. long, 8in. to 16in. broad; pinnæ 4in. to 8in. long, about ¾in. broad, with broad blunt lobes reaching from a quarter to a third down, lower ones not reduced. *sori* medial.

Nephrodium—*continued.*

Himalayas, &c. A hardy species, in general habit resembling *N. Filix-mas.* (H. S. F. iv. 249.)

N. hispidum (hispid).* *rhiz.* stout, creeping. *sti.* 1ft. to 1½ft. long, densely scaly. *fronds* 1ft. to 1½ft. long, 8in. to 12in. broad, sub-deltoid; pinnæ lanceolate, the lowest deltoid; lowest pinnules larger than the others, which are lanceolate, with lanceolate segments cut down to a winged rachis into small, oblong or linear, sharply-toothed lobes. *sori* copious. New Zealand, &c. A very handsome little greenhouse species.

N. Hookeri (Hooker's). A synonym of *N. Arbuscula.*

FIG. 677. NEPHRODIUM LEUZEANUM, showing Habit and detached Pinnule.

N. Hudsonianum (Hudson's). A synonym of *N. truncatum.*

N. inæquale (unequal).* *sti.* 1ft. or more long, with a dense tuft of reddish-brown scales at the base. *fronds* 1ft. to 2ft. long, 8in. to 12in. broad, ovate-deltoid; lower pinnæ rather shorter and broader than the next, which are 6in. to 8in. long, 2in. to 3in. broad; pinnules lanceolate, cut down nearly to the rachis into oblong spinose-serrated segments. *sori* in two rows near the midrib; involucre firm, naked. Cape Colony and Natal. Greenhouse.

N. intermedium (intermediate). *sti.* 1ft. to 2ft. long, densely fibrillose at the base. *fronds* 2ft. to 3ft. long, 1ft. to 1½ft. broad, sub-deltoid; lower pinnæ lanceolate, often 1ft. long, 4in. to 5in. broad; pinnules close, lanceolate, having distinct oblong-lanceolate segments, with ligulate sub-entire lobes, about one 1in. broad. *sori* small, copious, nearer the midrib than the edge; involucre thin, fugacious. North India, Japan, &c. Greenhouse.

N. invisum (unseen). *rhiz.* stout, wide-creeping. *sti.* 1ft. or more long, stout, villose. *fronds* 1½ft. to 2ft. long, 8in. to 12in. broad; pinnæ numerous, 4in. or 5in. long, ½in. broad, cut about one-third down into sharp, triangular, falcate lobes; lower pinnæ distant and dwarfed. *sori* in rows close to the midrib; capsules setose. Polynesian Islands, 1830. SYN. *Lastrea invisa.*

N. Kaulfussii (Kaulfuss's). *sti.* tufted, 4in. to 6in. long, slender, slightly pubescent. *fronds* 1½ft. to 2ft. long, 6in. to 8in. broad, oblong-lanceolate; pinnæ 3in. to 4in. long, ½in. to ⅝in. broad, cut down nearly to the rachis into spreading, entire, blunt lobes, two lines broad, the lower ones not enlarged, and the lower pinnæ dwindling down gradually. *sori* medial; involucre fugacious. West Indies to Brazil.

N. Leuzeanum (Leuze's).* *cau.* sub-arborescent, densely scaly at the crown. *sti.* 2ft. to 3ft. long, stout, striated. *fronds* 4ft. to 6ft. long, sub-deltoid; pinnæ 1ft. to 1½ft. long, 6in. to 8in. broad, simple, or the lowest with two or three large pinnated pinnules from the lower side; segments 3in. to 4in. long, ¾in. to 1¼in. broad, with oblong, sub-falcate, entire, or sinuated lobes reaching down to a broadly-winged rachis. *sori* copious, usually in close single rows in the lobes. North India to Fiji, 1874. SYN. *Pleocnemia Leuzeana.* See Fig. 677.

N. marginale (marginal-spored). *sti.* tufted, 6in. to 12in. long, with large concolorous scales at the base. *fronds* 18in. to 24in. long, 6in. to 8in. broad, oblong-lanceolate, bipinnate; pinnæ 3in. to 4in. long, 1in. to 1½in. broad; pinnules ovate-oblong, blunt, nearly entire. *sori* marginal. North America, 1772. Hardy.

N. membranifolium (membranous-fronded). A synonym of *N. dissectum.*

N. molle (soft).* *sti.* tufted, 1ft. or more long, rather slender, hairy. *fronds* 1ft. to 2ft. long, 8in. to 12in. broad; pinnæ spread-

Nephrodium—*continued.*

ing, 4in. to 6in. long, ⅜in. broad, cut about half-way down to the midrib into scarcely falcate, blunt lobes; the lower pinnæ distant, and rather shorter than the others. *sori* distant from the midrib; capsules naked. Tropics, 1820. A well-known and very variable species, of which the following are varieties:

FIG. 678. NEPHRODIUM MOLLE CORYMBIFERUM, showing Habit and Portions of detached Frond.

N. m. corymbiferum (corymb-bearing).* A most interesting and desirable plant, erect in habit, producing branched fronds, 1ft. to 2ft. long; the top of each frond or branch has a large crest or corymb, and the ends of the pinnæ are similarly furnished, but on a smaller scale. See Fig. 678.

FIG. 679. PORTION OF FROND OF NEPHRODIUM MOLLE GRANDICEPS.

N. m. grandiceps (large-crested). A garden variety, with a large terminal crest, and the pinnæ also conspicuously crested. See Fig. 679.

Nephrodium—*continued.*

N. montanum (mountain). Mountain Buckler Fern. *sti.* short, tufted. *fronds* 1½ft. to 2ft. long, 6in. to 8in. broad; pinnæ 3in. to 4in. long, 1in. broad at the base, cut down to a broadly-winged rachis into close, blunt, oblong lobes; lower pinnæ distant, and gradually dwarfed down to mere auricles. *sori* in rows near the edge. Europe (Britain), &c. SYN. *Lastrea montana.* The following are the more important varieties of this hardy species:

N. m. cristata (crested).* A rare and beautiful fragrant variety, in which the fronds are nearly as large as those of the type, but with the apex very finely crested or tasselled; the tips of the pinnæ are similarly furnished, but on a smaller scale.

N. m. Nowelliana (Nowell's). A very distinct variety, having the fronds from 1ft. to 1½ft. long, and 4in. or 5in. in width, pinnate, with narrow pinnæ, and the lobes much abbreviated and erose.

N. m. truncata (truncated). A very curious and rare form, with prærmorse pinnæ.

N. noveboracense (New York). *rhiz.* slender, wide-creeping. *sti.* 1ft. long, stramineous. *fronds* 1ft. to 2ft. long, 4in. to 6in. broad; pinnæ spreading, 2in. to 3in. long, ½in. broad, cut down very nearly to the rachis into linear-oblong lobes, those of the barren frond the broadest; lower pinnæ small, deflexed. *sori* soon confluent, in the rows near the flat edge. North America, 1812. Hardy.

N. odoratum (fragrant). *sti.* 1ft. to 1½ft. long, densely scaly at the base. *fronds* 9in. to 18in. long, deltoid; lowest pinnæ much the largest, deltoid, 6in. to 9in. long, 3in. to 4in. broad; pinnules lanceolate, often imbricated, with ovate or oblong pinnatifid segments, with blunt rounded lobes. *sori* copious. Involucres large, pale, villous. Tropical Asia, &c. SYNS. *N. eriocarpum* and *N. hirsutum.*

N. Otaria (Otaria). *sti.* 6in. to 12in. long. *fronds* 1ft. or more long, with a linear-oblong terminal pinna, 4in. to 6in. long, 1in. to 1½in. broad, the apex acuminate, the margin with finely serrated lanceolate lobes reaching a quarter or a third of the way down, and from three to six distant spreading similar lateral ones on each side, the lower ones stalked. *sori* one on each veinlet. Philippines, &c. SYN. *N. aristatum.* (H. S. F. iv. 238.)

N. pallidivenium (pale-veined). *sti.* 1ft. or more long, naked or nearly so. *fronds* 2ft. to 3ft. long, 8in. to 12in. broad; pinnæ 4in. to 6in. long, ⅜in. to 1in. broad, cut two-thirds of the way down to the rachis into linear-oblong, slightly falcate lobes; lower pinnæ not much smaller than the rest. *sori* small, in close rows about midway between the midrib and edge. Guinea Coast.

N. palustre (marsh-loving). *sti.* 1ft. or more long, naked. *fronds* 2ft. to 3ft. long, 8in. to 12in. broad; pinnæ close, erecto-patent, 4in. to 6in. long, ⅜in. broad, cut down nearly to the rachis into linear oblong, entire, slightly falcate lobes, ⅛in. broad. *sori* filling up the greater part of the space between midrib and edge; involucre small, ciliated. Brazil.

N. patens (spreading).* *rhiz.* oblique. *sti.* 1ft. or more long, naked or slightly pubescent. *fronds* 2ft. to 3ft. long, 8in. to 12in. broad; pinnæ 4in. to 9in. long, ½in. to ⅝in. broad, cut down about three-quarters of the space to the rachis into linear-oblong, sub-falcate lobes. *sori* nearer the edge than the midrib. Involucre persistent. Tropics, &c. A distinct and strong-growing species.

N. p. cristata (crested). A garden form, with the pinnæ curiously forked and crested. See Fig. 680.

N. pennigerum (winged). *sti.* tufted, stout, 8in. to 12in. long, villose. *fronds* 2ft. to 4ft. long, 1ft. to 1½ft. broad; pinnæ numerous, spreading, 6in. to 9in. long, 1in. to 1½in. broad, the apex acuminate, the edge cut above a quarter of the way down to the midrib into oblong, falcate lobes, the lower pinnæ dwarfed and distant. *sori* medial; capsules setose. Himalayas, &c. SYN. *N. articulatum.*

N. podophyllum (footstalk-fronded). *sti.* tufted, 1ft. long, naked upwards. *fronds* 1ft. to 1½ft. long, 8in. to 12in. broad; pinnæ four to eight on each side, erecto-patent, 4in. to 6in. long, 8in. to 12in. broad, the edge nearly entire, or with shallow, broad, blunt lobes; veins pinnate in the lobes, having two to four veinlets on a side, with sometimes a sorus on each, distant from the main vein. Japan and Hong Kong. Greenhouse, or nearly hardy.

N. pteroides (Pteris-like).* *sti.* 1ft. to 2ft. long, slender, slightly scaly below. *fronds* 2ft. to 4ft. long, 1ft. or more broad; pinnæ spreading, 4in. to 8in. long, ⅜in. broad, the apex acuminate, the edge cut one-third or half-way down into oblong or sub-triangular lobes. *sori* quite marginal, and confined to the lobes. Tropical Asia, &c. A distinct and handsome species.

N. pubescens (downy). *sti.* 6in. to 18in. long, slender, villose. *fronds* 6in. to 18in. long, deltoid; lower pinnæ much the largest; pinnules lanceolate; lower segments usually free, oblong-rhomboidal, unequal-sided. *sori* small, distant from the midrib. West Indies. SYN. *Phegopteris villosa.*

N. purpurascens (purplish). A synonym of *N. sparsum.*

N. Raddianum (Raddi's). A synonym of *N. vestitum.*

N. refractum (curved-back). *sti.* tufted, 1ft. long. *fronds* 1ft. to 1½ft. long, 6in. to 9in. broad; pinnæ growing gradually less

Nephrodium—*continued.*

from near the bottom to the top, the lower ones deflexed, 4in. to 5in. long, ¾in. broad, the lowest pairs very much so; lobes broad and blunt, reaching about a quarter of the way down to the midrib. *sori* medial; involucre minute, fugacious. Brazil. (H. S. F. iv. 252.)

FIG. 680. NEPHRODIUM PATENS CRISTATA.

N. Richardsi (Richards's). *fronds* oblong-lanceolate, bipinnatifid, 1¼ft. to 1½ft. long, 8in. to 9in. broad; pinnæ moderately close, patent, ligulate-caudate, ¾in. broad, cut down to a narrow wing into close, ligulate, slightly repand, blunt lobes, one line broad; lowest pinnæ not reduced, their lowest lobes on both sides slightly so. *sori* medial; involucre firm, persistent, the lower half free, ovate-rhomboidal, cut down nearly to the rachis below. *sori* close to the midrib; involucre firm, prominent, fringed with glands. Europe (Britain), Asia Minor, North America. Hardy.

N. sanctum (sacred). *sti.* densely tufted, slender, 2in. to 3in. long, naked upwards. *fronds* 6in. to 9in. long, 1in. to 2in. broad,

Nephrodium—*continued.*

slightly pilose. New Caledonia. Greenhouse. SYN. *Lastrea Richardsi.*

N. rigidum (rigid).* *sti.* tufted, 6in. long, densely scaly below. *fronds* 1ft. to 1½ft. long, 4in. to 6in. broad, oblong-lanceolate; largest pinnæ 2in. to 3in. long, 1in. to 1½in. broad, the pinnules of

Nephrodium—*continued.*

lanceolate; pinnæ distant, ½in. to 1in. long, 1½in. to 3in. broad, the point bluntish, the edge more or less deeply pinnatifid; the lobes sometimes close and linear-oblong, sometimes distinct, linear or spathulate. *sori* minute; involucre very fugacious. West Indies, &c. SYN. *Lastrea sancta.*

N. Sieboldii (Siebold's).* *cau.* tufted, scaly. *sti.* 6in. to 12in. long, scaly below. *fronds* with an entire or slightly toothed, lanceolate-oblong, terminal pinna, 8in. to 12in. long, and 1½in. to 2in. broad, and from two to four similar ones on each side, the lowest shortly stalked. *sori* large, copious, scattered. Japan. Greenhouse, or nearly hardy. SYN. *Pycnopteris Sieboldii.*

N. sophoroides (Sophora-like). *sti.* 1ft. or more long, slender, pubescent. *fronds* 1ft. to 2ft. long, 6in. to 9in. broad; pinnæ spreading, 4in. to 6in. long, ½in. to ¾in. broad, apex acuminate, the edge cut one-third the way down into oblong-triangular, subfalcate lobes. Japan, &c. Greenhouse.

N. sparsum (scattered). *sti.* tufted, 6in. to 12in. long, scaly only at base. *fronds* 1ft. to 2ft. long, 8in. to 12in. broad, ovate-lanceolate; lowest pinnæ the largest, 4in. to 6in. long, 1½in. to 2in. broad; lowest pinnules sometimes compound, the others lanceolate, unequal-sided, pinnatifid, with oblong, blunt lobes. *sori* usually one to each lobe, near the midrib; involucre naked, flat, one line broad. North India to Mauritius. A noble greenhouse species. SYN. *N. purpurascens.* (H. S. F. iv. 262.)

N. spinulosum (rather spiny).* *sti.* tufted, about 1ft. long, scaly. *fronds* 1ft. to 1½ft. long, 6in. to 8in. broad, oblong-lanceolate; lower pinnæ sub-deltoid, 3in. to 4in. long, 1½in. to 2in. broad, the lowest pair about equal to the next; pinnules ovate-lanceolate, the largest about 1in. long, ½in. broad, cut down to the rachis below into close oblong lobes, with copious aristate teeth; involucre not gland-ciliated. Europe (Britain), Africa, North-east Asia, and North America. Hardy. The following are the most important varieties:

N. s. dilatatum (enlarged-crested).* Scales denser and narrower than those of the type, dark brown in the centre. *fronds* ovate-lanceolate or sub-deltoid, larger and more deeply cut, the colour darker, the pinnæ closer, and the under surface often finely glandular; involucre gland-ciliated. SYN. *Lastrea dilatata.*

N. s. lepidota (scaly). Rachises chestnut-brown, scaly. *fronds* sub-deltoid; lower pinnæ deltoid, 5in. to 6in. each way; lowest pinnules much the largest, often 3in. long, 2in. broad; its segments cut down to the rachis below, and with lobes again deeply pinnatifid.

N. s. remotum (remote). *fronds* oblong-lanceolate, about 2ft. long, 6in. broad; pinnæ lanceolate, close; pinnules ovate-oblong, only the lowest free, the largest about 1in. long, ½in. broad, cut half-way down to the rachis or more; spinulose teeth few; under side and involucre not glanduiar.

Mr. B. S. Williams describes the following varieties as forms of *Lastrea dilatata*: *angustipinnula*, a pretty and distinct form, having fronds about 1¾ft. long and 9in. wide, with somewhat distant pinnæ and very irregular pinnules. *Chanteriæ*, a distinct form, with bi-pinnate lanceolate fronds, 1ft. to 2ft. long, and 8in. to 9in. wide, diminishing towards the apex; pinnæ distant; pinnules very obtuse and dentate. *dumetorum*, a very desirable plant, the fronds of which have a peculiar undulating surface, and rarely exceed 1ft. in length. *Stansfieldii*, a very beautiful subject, with fronds 6in. to 12in. long and 4in. broad, ovate-lanceolate; pinnæ obtuse; pinnules deeply serrated on the margins, and curled.

N. subquinquefidum (somewhat five-cut). *sti.* 1ft. or more long, firm. *fronds* 6in. to 18in. each way; lower pinnæ much the largest, with the pinnules on the lower side much larger than the others, which are from 1in. to 3in. broad, often cut down nearly to the rachis below into broad, oblong lobes. *sori* medial. West Indies to Brazil, tropical Africa. SYNS. *N. funestum* (H. S. F. iv. 259), *N. Vogelli*, and *Lastrea pilosissima.*

N. Thelypteris (Thelypteris). *rhiz.* slender, wide-creeping. *sti.* about 1ft. long, slender. *fronds* 1ft. to 2ft. long, 4in. to 6in. broad; pinnæ spreading, 2in. to 3in. long, ½in. broad, cut down very nearly to the rachis into entire, spreading, linear-oblong lobes, those of the barren frond the broadest; lower pinnæ equalling the others. *sori* small, not confluent, in rows near the recurved edge. Europe (Britain), Asia, Africa, North America, New Zealand, &c. A very distinct hardy species.

N. truncatum (truncate). *sti.* tufted, stout, erect, 2ft. long, naked or slightly villose. *fronds* 2ft. to 4ft. long, 1ft. to 1½ft. broad; pinnæ 6in. to 9in. long, 1in. broad, cut down one-third or more of the distance to the rachis into blunt, spreading, oblong lobes; lower pinnæ small. *sori* one on each veinlet, near the main vein. North India, Australia, &c., 1869. A very fine but rare greenhouse species. SYNS. *N. abruptum* (H. S. F. iv. 241B), *N. obscurum*, and *N. Hudsonianum.*

Nephrodium—*continued.*

N. unitum (joined). *sti.* 1ft. to 1½ft. long, naked. *fronds* 2ft. or more long, 6in. to 8in. broad; pinnæ 4in. to 5in. long, ½in. broad, the edge cut from one-third to half-way down into spreading, triangular, sharp-pointed lobes; lower pinnæ not dwindling down. *sori* near the extremity, principally in the lobes; capsules naked. Florida and West Indies, to Brazil, &c. A fine, tall-growing species.

N. venulosum (veined). *sti.* 1½ft. long, naked, greyish, sharply angled. *fronds* 4ft. long, 1ft. to 1½ft. broad; pinnæ numerous, the lowest short and very distant, the largest 8in. to 9in. long, 1in. broad, cut down half-way to the rachis into slightly-toothed, oblong lobes; veins about nine on each side, conspicuous above, with a sorus on each midway to the edge. Fernando Po

N. venustum (charming).* *sti.* tufted, 1ft. or more long, naked. *fronds* 2ft. or more long, 1ft. broad; pinnæ numerous, spreading, 6in. long, 1in. broad, with blunt, oblong lobes, reaching half-way down. *sori* principally in the lobes, close to the edge. Jamaica. A handsome species. (G. C. 1855, 677.)

N. vestitum (clothed).* *sti.* 6in. to 12in. long, stout, densely scaly. *fronds* 1ft. to 2ft. long, 6in. to 10in. broad; pinnæ 3in. to 5in. long, ¾in. to 1in. broad, cut down to a narrowly-winged rachis into blunt, entire, falcate lobes, two lines broad. *sori* close to the midrib. South Brazil. A handsome species. SYNS. *N. Raddianum* and *Lastrea vestita.*

N. villosum (villose).* *sti.* tufted, 2ft. to 3ft. or more long, stout, usually villose and densely scaly. *fronds* 4ft. to 6ft. or more long, 2ft. to 3ft. or more broad; pinnæ often 2ft. long, 1ft. broad; pinnules lanceolate, cut down to the rachis into close, oblong, pinnatifid segments; largest entire lobes ¾in. long, ⅛in. broad. *sori* copious; involucre flat, half a line broad, often suppressed. West Indies, to Peru and Chili, 1793. A fine species. (H. S. F. iv. 264.)

N. Vogelli (Vogel's). A synonym of *N. subquinquefidum.*

NEPHROLEPIS (from *nephros*, a kidney, and *lepis*, a scale; referring to the covering of the sori). Including *Arthropteris* (in part). ORD. *Filices.* A small genus (ten species) of very handsome stove ferns, widely dispersed over the tropical parts of the globe. Fronds simply pinnate, with the pinnæ articulated at the base, and often very deciduous in the dried plant, with white cretaceous dots on the upper surface. Sori round, arising from the apex of the upper branch of a rim, generally near the edge; involucre reniform or roundish. Veins in all free. Several species are well adapted for growing in suspended baskets; they do very well in a compost of peat, loam, and sand, with an abundant supply of water. For general culture, *see* **Ferns.**

FIG. 681. NEPHROLEPIS DAVALLIOIDES, showing Habit and Portion of detached Frond

N. acuta (acute). *sti.* tufted, 4in. to 8in. long, firm, naked, or slightly scaly. *fronds* 2ft. to 4ft. long, 8in. to 12in. broad; pinnæ 4in. to 8in. long, ½in. to 1in. broad, acute, the edge entire or slightly crenate, the upper side auricled, the lower rounded at the base. *sori* sub-marginal. Involucre sub-orbicular, sub-

Nephrolepis—*continued.*

peltate. SYNS. *N. biserrata*, *N. ensifolia*, *N. punctulata*, and *N. splendens*.

N. biserrata (twice-serrated). A synonym of *N. acuta*.

N. cordifolia (cordate-fronded).* *cau.* sub-erect or oblique, the wiry fibres often bearing tubers. *sti.* tufted, wiry, 1in. to 4in. long, scaly. *fronds* 1ft. to 2ft. long, 1½in. to 2in broad: pinnæ close, often imbricated, about 1in. long, ¼in. to ⅜in. broad, usually blunt, the edge entire or slightly crenate, the under side rounded or crenate, the upper distinctly auricled at the base. *sori* in a row about midway between the midrib and edge; involucre firm, distinctly reniform, oblique, or opening towards the outer edge. **Tropical America, 1841. A handsome species.** SYN. *N. tuberosa*.

Nephrolepis—*continued.*

N. d. furcans (forked). A beautiful and distinct crested variety, of robust growth, sending forth numerous arching fronds from 3ft. to 4ft. long, and, both in habit and general appearance, a great improvement on the type. See Fig. 682, for which we are indebted to Messrs. W. and J. Birkenhead.

N. Duffii (Duff's).* *sti.* 6in. to 8in. long. *fronds* about 2ft. long, tufted, pinnate, narrow-linear, the apex multifidly forked; tip of frond two or three times forked, the tips of the branches again shortly divided; pinnæ small, rounded or flabellate, twin, overlapping each other, crenate at the edge. *sori* absent. **Duke of York Island, 1873. A very elegant species, having fascicles of numerous gracefully-arching fronds. See Fig. 683.** (G. C. n. s., ix. 623.)

FIG. 682. PORTION OF FROND AND DETACHED PINNA OF NEPHROLEPIS DAVALLIOIDES FURCANS.

N. c. pectinata (comb-like). A variety of the preceding, producing no tubers. Stem and rachis naked; pinnæ less distinctly auricled at the base on the upper, obliquely truncate on the lower, side. SYN. *N. pectinata*.

N. davallioides (Davallia-like).* *cau.* short, stoloniferous. *sti.* tufted, 1ft. or more long, scaly towards the base. *fronds* drooping, **2ft. to 3ft. long, 1ft. or more broad; lower pinnæ barren, 4in.** to 8in. long, ½in. to 1in. broad, the apex acuminate, the edge inciso-crenate to a depth of one line or less; fertile pinnæ narrower, the lobes deeper, and bearing each a single sorus at the point. Involucre reniform. Malaya, 1862. **A beautiful species, probably the handsomest of the genus, and easily distinguished by its pinnatifid fertile pinnæ, with the sori at the tip of the lobes. See Fig. 681.** (G. C. 1855, 388.)

N. ensifolia (sword-fronded). A synonym of *N. acuta*.

N. exaltata (lofty). *sti.* tufted, 4in. to 6in. long, firm, naked, or slightly scaly. *fronds* 1ft. to 2ft. or more long, 3in. 6in to broad; pinnæ close, 1 in. to 3in. long, ¼in. to ⅓in. broad, usually acute, the edge entire or slightly crenate; the upper side auricled, the lower rounded at the base. *sori* sub marginal; involucre firm, distinctly reniform. Tropics, 1793. To this well-known and desirable species Mr. J. G. Baker refers *N. volubilis*.

N. e. hirsutula (small haired). A variety with the rachis densely, and both surfaces more or less, coated with ferruginous down. SYN. *N. hirsutula*.

N. falciformis (sickle-formed). *fronds* 1½ft. to 2ft. long, sub-erect, linear; pinnæ numerous; lower (sterile) ones elliptical,

Nephrolepis—*continued.*

obtuse, truncate at base; superior (fertile) ones lanceolate-falcate, acute, sub-deflexed, 1½in. long, ½in. wide, truncate at base, sub-auriculate on the upper margin. *sori* uniserial, anti-marginal. Borneo.

N. hirsutula (small-haired). A synonym of *N. exaltata hirsutula.*

N. obliterata (obliterated). A synonym of *N. ramosa.*

N. pectinata (comb-like) A synonym of *N. cordifolia pectinata.*

FIG. 683. NEPHROLEPIS DUFFII, showing Habit and Portion of detached Frond.

N. pluma (feather).* *fronds* 4ft. to 5ft. long, 4in. broad, linear, pendulous, pinnate; pinnæ about 2in. long, articulated with the rachis, usually falcately nerved, broadest at the cordate base, the margin thickened, nearly entire towards the base, and notched upwards in a series of oblique crenatures. *sori* transversely set at the end of the anterior venule of each fascicle, one to each crenature. Madagascar, 1878. A very handsome greenhouse species, with wiry stolons. (G. C. n. s., ix. 589.)

N. punctulata (small-dotted). A synonym of *N. acuta.*

N. ramosa (branched). *sti.* very short, scattered, on a slender, wiry, wide-creeping rhizome. *fronds* 6in. to 12in. long, 1in. to 3in. broad; pinnæ ½in. to 1½in. long, ¼in. to ½in. broad, slightly crenate, the upper edge auricled and truncate, parallel with the stem, the lower oblique; involucre roundish, very fugacious. Tropics of Old World. SYNS. *N. obliterata* and *N. trichomanoides.*

N. splendens (glittering). A synonym of *N. acuta.*

N. trichomanoides (Trichomanes-like). A synonym of *N. ramosa.*

N. tuberosa (tuberous). A synonym of *N. cordifolia.*

N. volubilis (twining). A straggling, flexuous form of *N. exaltata.*

NEPHROSPERMA (from *nephros*, a kidney, and *sperma*, a seed; referring to the shape of the seed). ORD. *Palmeæ.* A monotypic genus, the species being a very elegant, armed, stove palm, thriving in a compost of turfy loam, leaf mould, and sand. Care should be taken not to overpot, for when grown with but limited root room, and plentifully supplied with water, the plants are very useful for decorative purposes in a young state.

N. Van Houtteanum (Van Houtte's).* *fl.* large. *l.* pinnate, gracefully arched, divided into rather broad and long pendulous, acuminate, unequal segments; petioles rather short. *h.* 20ft. to 35ft. Seychelles, &c., 1868. SYNS. *Areca nobilis* and *Oncosperma Van Houtteanum.*

NEPHTHYTIS (named after Nephthys, the mother of Anubis, the wife of Typhon). ORD. *Aroideæ* (*Araceæ*). This genus contains but three species of tall herbs, chiefly of botanical interest, and natives of Western tropical Africa. Spathes membranous, elliptic, acute;

Nephthytis—*continued.*

spadix shorter than the spathe; peduncle slender, erect. Leaves large, on long petioles, membranous, triangularly sagittate. *N. liberica* and *N. constricta* are stove perennials, the second species not being worthy of special mention. The species thrive in a hot, moist atmosphere, and like a light, well-drained soil, rich in humus. Plenty of water at the roots during the season of growth is essential.

N. liberica (Liberian). *fl.*, spathe concave, expanded, ovate-oblong, shortly cuspidate, 2½in. long, green; spadix shorter than the spathe; scape terminal, overtopping the leaves. *l.* on long petioles, sagittate, bright green. Stem subscandent. Liberia, 1881.

NEPTUNIA (so called after Neptune, god of the sea; in reference to the species growing in lakes and ponds). ORD. *Leguminosæ.* A genus comprising about eight species of diffuse, prostrate, or floating perennial herbs or sub-shrubs, inhabiting North and South America, tropical Asia, and Australia. Flowers in globular heads, the lower ones barren, with elongated petals; the upper ones fertile, with definite stamens, as in *Desmanthus.* Leaves bipinnate; leaflets small. *N. plena*, the only species yet introduced, thrives well in a stove aquarium, or in tubs or pans filled with water, having a few inches of soil in the bottom. The white, spongy, lower portion of the stems, full of air-cells, enabling the plant to float, are very remarkable. The leaflets and petioles are as irritable as those of *Mimosa pudica*, and are of an extremely delicate yellow-green colour.

N. plena (abounding). *fl.* pale yellow; peduncles bracteate. July to September. *l.* with two to four pairs of pinnæ, and each pinna bearing twelve pairs of leaflets. Stems prostrate, compressed. Tropics, 1733. Sub-shrub. (B. M. 4695.)

NERINE (called after the water nymph of that name). SYN. *Loxanthes.* ORD. *Amaryllideæ.* A genus comprising not more than ten distinct species of beautiful greenhouse or nearly hardy, bulbous plants, indigenous to South Africa. Flowers showy, in many-flowered umbels, erect or slightly declinate; perianth segments narrow, slightly erect at base, spreading or recurved; scape stout. Leaves loriform, sometimes rather broad, appearing with or after the flowers. When in flower, Nerines are amongst the most beautiful of greenhouse bulbous plants. They are propagated from offsets, and these should be grown on under the same treatment as established bulbs. Loam and leaf soil, with charcoal or sharp sand added, is a good compost to use, and efficient drainage must be provided. The periods for growing and resting must be annually allowed with these, as with most other South African bulbs. The Guernsey Lily (*N. sarniensis*) is a beautiful, well-known species, which may be purchased in August, when the flower scapes are just appearing. As the bulbs have for some time previously been kept quite dry, they should be very gradually subjected to watering. *N. curvifolia* is also an exceedingly beautiful species, and one of the most vigorous growers. Nerines do not require repotting very frequently, but an annual top-dressing of new soil is of material advantage when the flowering season begins. This is chiefly autumn and winter, but varies somewhat with different species, according to their habit of flowering before or after the leaves appear. During the season of growth, the plants succeed best in a frame on a dung bed, with a little bottom heat. When the

Nerine—*continued.*

leaves die, store the plants away in a cool place, and keep the soil quite dry, until signs of growth are again apparent.

N. curvifolia (curved-leaved).* *fl.* bright glittering scarlet, scentless, in a many-flowered convex umbel; perianth regular, with the segments slightly cohering at base. Blossoms at various seasons. *l.* glaucous, oblong-linear, or thong-shaped, depressed along the middle. 1788. (A. B. R. 163, under name of *Amaryllis Fothergillia*; B. M. 725, under name of *A. curvifolia.*)

N. filifolia (thread-leaved). *fl.*, perianth rose-red, 1in. long; umbel centripetal, eight to ten-flowered; pedicels densely glandular, pubescent; scape 1ft. long. October. *l.* six to ten from a bulb, slender, 6in. to 8in. long. (B. M. 6547.)

N. flexuosa (zigzag).* *fl.* of a vivid crimson-scarlet, slightly tinged with orange, umbellate. *l.* lighter green, and less glaucous than in *N. sarniensis corusca.* *h.* 1ft. 1795. (B. R. 172, under name of *Amaryllis flexuosa.*)

N. f. excellens (excelling).* *fl.* bright rosy-pink, with a carmine-crimson rib down the centre of each reflexed segment; umbels many-flowered. 1883. A beautiful variety, of very free-flowering habit.

N. f. pulchella (pretty).* *fl.* about seven; perianth pale pink, striped with red; style and filaments white; spathe reddish; scape over 2ft. high. July. *l.* over ½in. wide, glaucous. 1820. (B. M. 2407.)

N. humilis (dwarf). *fl.* purplish-rose, variegated with paler tints, scentless, in a six to twenty-flowered umbel; perianth segments scarcely cohering; scape longer than the leaves. Late summer. *l.* oblong-linear, somewhat channelled, rounded at the points. (B. M. 726, under name of *Amaryllis humilis.*)

N. japonica. *See* **Lycoris radiata.**

N. Plantii (Plant's). A synonym of *N. sarniensis Plantii.*

N. pudica (chaste). *fl.* six to eight, 1½in. to 2in. long; perianth pure white, streaked with red; scape exceeding the leaves. October. *l.* 6in. to 8in. long, about ¼in. wide, narrow-linear, obtuse, not keeled or ribbed. (B. M. 5901.)

N. sarniensis (Guernsey).* Guernsey Lily. *fl.* pale salmon-coloured; perianth segments recurved at the extremity; scape from 2ft. to 2½ft. high, many-flowered. Autumn. *l.* appearing after the flowers. 1680. (B. M. 294, under name of *Amaryllis sarniensis.*)

N. s. corusca (glittering).* *fl.* brilliant orange-scarlet, very large, about thirty on a strong scape. *l.* broad, oblong, entire. *h.* 1ft. 1809. (B. M. 1089, under name of *Amaryllis corusca.*) A sub-variety, known in gardens as *major*, has pale orange-scarlet coloured flowers, and much narrower segments, which are scarcely so much recurved at the extremities as in the type.

N. s. Plantii (Plant's). This differs from the type in the colour of the flower being a duller crimson, in the longer peduncle, and in the more distinctly unguiculated perianth segments. Possibly a hybrid between *N. sarniensis* and *N. flexuosa.* (Gn. March 25, 1882, under name of *N. Plantii.*)

N. s. venusta (charming).* *fl.* fiery scarlet, in large umbels. June. 1806. A beautiful variety, flowering at the same time as the type. (B. M. 1090, under name of *Amaryllis venusta.*)

FIG. 684. INFLORESCENCE OF NERINE UNDULATA.

N. undulata (wavy-flowered).* *fl.* soft flesh-colour, with the segments of a wavy or undulating outline; scape about 1ft. high, many-flowered. May. *l.* narrow-ligulate or strap-shaped, pale green, generally preceding the flowers. 1767. See Fig. 684. (B. M. 369, under name of *Amaryllis undulata.*)

NERISSA. Included under *Hæmanthus.*

NERIUM (the old Greek name used by Dioscorides, from *neros*, humid; referring to the habit of the species). Oleander. ORD. *Apocynaceæ.* A small genus (two or three species) of very ornamental, erect, greenhouse shrubs, natives of the Mediterranean region and sub-tropical Asia, extending to Japan. Flowers showy, in terminal, shortly pedicellate racemose cymes; corolla pink, white, or yellowish, funnel-shaped; throat crowned by toothed or lacerated segments; lobes five. Leaves three, or rarely four, in a whorl, very rarely opposite, narrow, coriaceous. The leaves are fatal to animals (horses, &c.); the flowers have caused death to those who carelessly picked and ate them, and it is on record that the branches, divested of their bark, and used as skewers, have poisoned the meat roasted on them, and killed seven of twelve people who partook of it. Good plants of Neriums are not unattractive, even when out of flower, on account of their pointed evergreen foliage. The flowers are only produced on mature, well-ripened shoots; consequently, the plants must be well exposed to sun and air throughout their period of growth, which is spring and early summer; the flowers appear later in the season. After flowering, a rest should be allowed for a time, by withholding water, which, at other times, should be freely given. The plants may then be cut back, and encouraged to make a little growth before winter. Repot in early spring, according as the different sized plants require, using a compost of loam and decayed manure, in about equal proportions. Neriums are propagated by cuttings of matured

FIG. 685. LEADING BRANCHLET OF NERIUM OLEANDER.

leading shoots (see Fig. 685), inserted in single pots, and placed in a close, warm frame; or they may be rooted successfully in bottles of water, and afterwards potted carefully in soil. Established plants may be placed in a warm position in the open air, in summer, or kept in a light, airy greenhouse. They are subject to several insect pests, especially Red Spider and Mealy Bug. Frequent sponging will be necessary, in order to keep the leaves clean and healthy.

N. odorum (sweet-scented). *fl.* pale red, with an agreeable musky scent; segments of the crown multifid, filamentose at the apex. June to August. *l.* linear-lanceolate, three in a whorl, coriaceous, with revolute edges, 5in. to 7in. long. *h.* 6ft. to 7ft. East Indies, 1823. Of this species, the following are varieties: *carneum*, with flesh-coloured flowers (B. M. 2032); *flore-pleno*, with flowers nearly double (B. M. 1799).

N. Oleander.* Common Oleander. *fl.* bright red, rather large; segments of corona trifid or cuspidate. June to October. *l.* lanceolate, three in a whorl, 4in. to 5in. long, dark green. *h.* 6ft. to 14ft. Mediterranean region, &c., 1596. (S. F. G. 242.)

Varieties. The following is a list of the most desirable varieties of the common Oleander; many of them are of Continental origin:

Album plenum. Flowers white, large; corolla double. Very pretty. See Fig. 686.

Nerium—*continued.*

Cupreatum. Flowers large, single, copper-coloured; lobes well expanded. Free-flowering.

Felix Bourguet. Flowers, inside pale saffron, outside rosy previous to opening, single. Very free-flowering.

Henri Mares. Flowers rosy-pink; corolla double. A beautiful shade of colour.

Madame Peyre. Flowers cream, semi-double. A good variety.

Madonna grandiflorum. Flowers creamy-white, large; lobes broad; corolla double. Very fine.

Mons. Balaguier. Flowers very pale pink, arge, well expanded. A delicate colour.

Paulin Gregoire. Flowers large, single. Beautiful bright rose colour.

FIG. 686. FLOWERING BRANCHLET OF NERIUM OLEANDER ALBUM PLENUM.

Professor Duchartre. Flowers deep rosy-purple, of medium size; corolla double. Fine and distinct.

Professor Durand. Flowers pale yellow, hose-in-hose. Very free-flowering.

Rose Double. Flowers bright rose, double. Large and fine.

Sœur Agnes. Flowers pure white, single. Very pretty.

Souvenir du Felix Dunal. Flowers bright rose, large; corolla double. Very good

Splendens. Flowers bright red, double.

Variegatum. Flowers red; leaves edged with white or yellow.

NERTERA (from *nerteros*, lowly; referring to the habit of the species). SYNS. *Cunina*, *Erythrodanum*, *Leptostigma*, *Nerteria*. ORD. *Rubiaceæ*. A genus comprising about half-a-dozen species of very small, slender, creeping herbs, indigenous to the mountains of Java, the Philippine and Sandwich Islands, the Andes of South America, Australia, New Zealand, and the Antarctic lands. Flowers axillary, inconspicuous, sessile. Berry red, ovoid or globose, two-stoned. Leaves small, opposite, sessile or petiolate, ovate or ovate-lanceolate. *N. depressa*, commonly known under the absurd name of Flowering or Fruiting Duckweed, the only species introduced, is a charming hardy, alpine, perennial rock plant, which forms a dense carpet, close on the ground, of creeping stems and tiny leaves, and is exceedingly attractive when covered with orange-red or crimson berries. It may be increased from seeds, but is more frequently propagated by division of the root; any small pieces will grow freely, especially if placed in a little warmth. The plants thrive in a sandy

Nertera—*continued.*

loam, to which the addition of some leaf soil is recommended. They prefer shade to bright sunshine, in summer, and if grown in the open, should be protected with a bell glass in winter. *N. depressa* is also well adapted for culture in pots or shallow pans. The plants, when inserted in early spring, should be placed in a little warmth until established, when a cool, airy position will be more suitable for the production of flowers, and, subsequently, berries. When the latter are set, the pots are sometimes utilised for plunging in carpet-bedding designs, where they prove most interesting and effective. The plants require plentiful supplies of water at the roots.

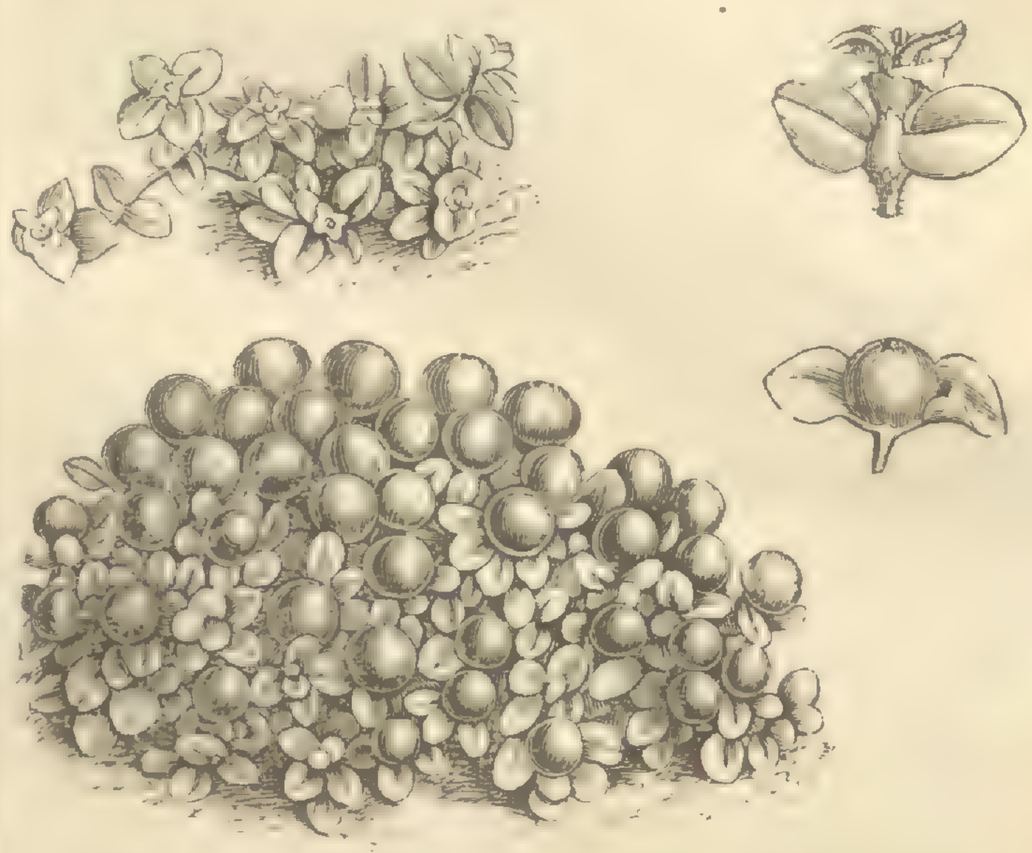

FIG. 687. NERTERA DEPRESSA, showing Plants in Flower and Fruit, and detached Flower and Fruit.

N. depressa (depressed).* Bead Plant. *fl.* greenish, inconspicuous, minute. *fr.* bright orange, globose, the size of small peas, produced in great profusion. *l.* small, ovate, almost fleshy. Stems smooth, creeping, rooting, thickly clothed with leaves. Antarctic Mountains, 1868. See Fig. 687. (B. M. 5799.)

NERTERIA. A synonym of **Nertera** (which *see*).

NERVES. The strong veins upon leaves or flowers.

NERVOSE, NERVOUS. Full of nerves.

NESÆA (said to be from *nesos*, an island; on account of its having been found in the Island of Mauritius). Including *Heimia*. ORD. *Lythrarieæ*. A genus comprising about a dozen species of glabrous or tomentose, erect, leafy, half-hardy herbs or sub-shrubs, with quadrigonal branches inhabiting the warmer parts of America and Africa. Flowers yellow, purple, or blue, disposed in axillary and often trichotomously divided peduncles, sometimes capitate; petals four to seven, inserted in the mouth of the calyx. Leaves opposite, rarely ternately whorled or alternate, entire. Seeds of the annual species must be sown in heat, in spring, and the plants hardened off and inserted in the open border at the end of May or beginning of June. The sub-shrubs, &c., succeed in sheltered spots, in any common garden soil. Propagated by seeds, by divisions of the root, or by cuttings. The two species here described are probably the only ones yet introduced.

N. salicifolia (Willow-leaved). *fl.*, petals obovate. August. *l.* ternate or opposite, the uppermost ones often alternate, very shortly stalked, lanceolate, acute, narrow at base. *h.* 5ft. Mexico, &c., 1821. Sub-shrub. SYN. *Heimia salicifolia*.

N. triflora (three-flowered). *fl.* blue, in threes, on the apex of the peduncle. August. *l.* opposite, oblong-lanceolate, obtuse or acute, on short petioles. *h.* 2ft. to 3ft. Mauritius, &c., 1802. A slender, half-hardy annual.

NETTED. Covered with reticulated projecting lines.

NETTING. For the protection and preservation of ripe fruits, seeds, seedling plants, &c., Netting of some description is an indispensable article in gardens. That made from wire, and afterwards galvanised, is mostly used when a permanent protection is needed, such as for keeping away ground-vermin from plants and trees which are known to be in danger of destruction in consequence of the bark or the whole plant being eaten. Old fish-nets are cheap, and form the best material for temporarily protecting fruits, seeds, &c., from the ravages of birds. When hung over fruit blossoms, in spring, Nets are frequently of great service in warding off the effects of frost, and admitting light at the same time. Netting of either kind is usually spoken of as being of a certain mesh; this signifies the diameter of the holes in it, and forms a guide in selecting for various purposes. It will generally last for several years, if taken care of, and kept in a dry place when not in use.

NETTLE. *See* **Urtica.**

NETTLE, DEAD. *See* **Lamium.**

NETTLE-TREE. *See* **Celtis.**

NEUBECKIA. Included under *Iris.*

NEUBERIA. A synonym of **Watsonia** (which *see*).

NEUDORFIA. A synonym of **Nolana** (which *see*).

NEUMANNIA. Included under **Pitcairnia** (which *see*).

NEURODIUM. *See* **Tænitis.**

NEUROLÆNA (from *neuron*, a nerve, and *læna*, a covering; referring to the three-nerved segments of the involucre). SYN. *Calea.* ORD. *Compositæ.* A genus comprising a couple of species of tall, stove or greenhouse, sub-shrubs, of which one is a native of Columbia and the West Indies, and the other of Mexico. Flower-heads whitish, small; involucre campanulate; bracts three or four-seriate, imbricate, narrow, membranous, rather obtuse. Leaves alternate, entire, denticulate, or lower ones three-lobed. Only one species, *N. lobata*, has been introduced. It thrives in a compost of loam, leaf mould, and sand, and should be grown in a light situation near the glass in a warm greenhouse.

N. lobata (lobed). *fl.-heads* yellow; corymbs heaped. June and July. *l.* variable, oblong-lanceolate or ovate-lanceolate, cuneate below the lobes, puberulous, scabrous, or tomentose beneath. *h.* 2ft. West Indies, 1733. (B. M. 1734, under the name of *Calea lobata.*)

NEUROPTERA. *See* **Insects.**

NEUROSPERMA. Included under **Momordica** (which *see*).

NEWBOULDIA (named in honour of the Rev. W. W. Newbould, one of the most genial and painstaking of British botanists). SYN. *Spathotecoma.* ORD. *Bignoniaceæ.* A genus comprising three species of glabrous stove trees, natives of tropical Africa. Flowers pink-violet, in thyrsoid panicles. Leaves, for the most part, opposite, sometimes ternately whorled, or slightly scattered, pinnate; leaflets often serrulate. The species here described is the only one introduced. For culture, *see* **Tecoma.**

N. lævis (smooth-leaved). *fl.* rosy-white or purple, in many-flowered, corymbose, terminal panicles. *l.* alternate or ternately-verticillate, impari-pinnate. (B. M. 4537, under name of *Spathodea lævis.*) *S. pentandra* (B. M. 3681) is probably a mere form of this species.

NEW JERSEY TEA. *See* **Ceanothus americanus.**

NEW ZEALAND FLAX. *See* **Phormium tenax.**

NEW ZEALAND SPINACH (*Tetragonia expansa*). A hardy or half-hardy annual, introduced by Sir Joseph Banks from New Zealand, where, amongst several other places, it is found native. The plants are

New Zealand Spinach—*continued.*

cultivated in gardens for the use of the young leaves, which form a substitute for those of the ordinary Spinach. They are, however, of inferior quality when cooked; but, as the plants grow very vigorously, do not run to seed, and withstand drought much better than the other varieties, a few should always be grown in case of a substitute being required in summer. They are propagated by seeds, which are very hard, and should be steeped in water before being sown. Sow on a gentle hotbed some time in March; protect the seedlings afterwards until May, when they may be planted out-

FIG. 688. BRANCHLET OF NEW ZEALAND SPINACH.

side. Distances of about 3ft. each way will usually be sufficient; a little more space might be allowed in extra good soils. New Zealand Spinach prefers a rather light rich soil, and succeeds best on a border with southern aspect. If the leaves are pinched off, and used when young, others will be freely produced, and keep up a succession. See Fig. 688.

NHANDIROBA. A synonym of **Fevillea** (which *see*).

NICANDRA (named after Nicander, of Colophon, who lived about 150 A.D., and wrote on medicine and botany). SYN. *Calydermos.* ORD. *Solanaceæ.* A monotypic genus, the species being an erect-branching, glabrous, hardy, annual herb. Propagated by seeds, sown in the open border. As soon as the seedlings are up, they must be planted separately: the plants, being large, require a good deal of space.

N. physaloides (Winter-cherry-like).* *fl.* blue, rather large, extra-axillary, solitary, drooping; calyx pentagonal, five-parted, inflated; stamens five. July to September. Berry fleshy, almost dry, three to five-celled, inclosed in the calyx. Leaves petiolate, membranous, deeply sinuate-dentate, or slightly lobed. *h.* 2ft. to 4ft. Peru, 1759. (B. M. 2458.)

NICOTIANA (named after Jean Nicot, 1530-1600, of Nismes in Languedoc; he was agent from the King of France to Portugal, and introduced tobacco into France). Tobacco. ORD. *Solanaceæ.* An extensive genus (upwards of fifty species have been described, of which probably not more than thirty-five are distinct) of mostly greenhouse or half-hardy herbs, sometimes suffruticose,

Nicotiana—*continued.*

rarely glabrous, sub-arborescent shrubs; they are mostly natives of America, a few are indigenous to the Pacific Islands and Australasia, and some are not unfrequently cultivated in various parts of the globe. Flowers white, yellowish, greenish, or purplish, disposed in terminal panicles, or in elongated, unilateral, bracteate or ebracteate racemes, or the lower ones solitary in the axils; calyx five-fid; corolla funnel- or salver-shaped, sometimes with a very long tube, the limb five-lobed. Leaves undivided, entire or rarely sinuated. Nicotianas thrive best in rich, deep soil, and in a rather moist situation, where they will grow with great rapidity. Seeds should be sown in February, in gentle heat, and the young plants pricked out when large enough. They should be placed in the open air early in June. The species are employed with great advantage in sub-tropical gardening. *N. affinis* succeeds admirably and flowers freely in 6in. pots, and thus forms a useful subject for greenhouse decoration. Its flowers are partially closed by day, but open at about 6 p.m., and emit a powerful perfume in the evening and night. It is also suited, on this latter account, for planting, in the summer time, in beds that are situated near walks.

FIG. 689. PLANT (EXCEPTING RADICAL LEAVES) AND DETACHED FLOWER OF NICOTIANA ACUTIFLORA.

N. acuminata (taper-pointed). *fl.*, corolla green-lined, about 3in. long; limb spreading; panicles few-flowered. Summer. *l.* broad-lanceolate, acuminate, undulated, stalked, entire, sometimes sub-cordate. Stem branched. *h.* 3ft. Valparaiso, &c. Herb. (B. M. 2918.)

N. acutiflora (acute-flowered).* *fl.*, corolla pure white, 4in. long, cylindrical; lobes acute; calyx pubescent, about ¾in. long. From

Nicotiana—*continued.*

June until frost. *l.*, radical ones oblong; upper ones distant, auriculate at base. Stem erect, 1ft. to 2ft. high. Brazil. A handsome annual herb, well suited for decorative purposes. See Fig. 689.

FIG. 690. FLOWERS OF NICOTIANA SUAVEOLENS.

N. affinis (related).* *fl.* deliciously night-scented; corolla with a slender tube 3in. to 3½in. long; limb 3in. across, consisting of five ovate, blunt segments, white inside, greenish outside. *l.*, lower ones numerous, about 6in. long, ovate, obtuse, narrowed into a winged petiole; upper ones smaller, more decidedly amplexicaul, broad. *h.* 2ft. to 3ft. Half-hardy annual herb. A splendid conservatory plant, hairy all over, except the inside of the corolla. (G. C. n. s., xvi. 141.)

FIG. 691. PORTION OF INFLORESCENCE OF NICOTIANA TABACUM.

N. fragrans (fragrant). *fl.* almost white, large, terminal, pendent, very fragrant; corolla with a very long tube and a broad limb; panicle large, terminal, the branches bearing glomerated racemes. Summer. *l.*, radical ones large, broadly ovate, spathulate; cauline ones few, distant, linear-spathulate, thick and fleshy. *h.* 3ft. to 4ft. Isle of Pines. Plant hairy, except inside of corolla limb. Cool greenhouse herb. (B. M. 4865.)

N. glauca (glaucous).* *fl.* yellow, covered with soft down; corolla having the tube slightly curved, the throat slightly inflated, the mouth contracted, the limb small, cup-shaped, with short acute segments; panicles terminal. August to October. *l.* unequally cordate-ovate, naked. *h.* 10ft. to 20ft. Buenos Ayres, 1827. Shrub, glaucous in every part, arboreous, erect, branched. (B. M. 2837.)

Nicotiana—*continued.*

N. Langsdorffii (Langsdorff's). *fl.* paniculate, nodding, subsecund; corolla green or yellowish-green; tube 1in. long, limb sub-plicate; peduncles very long, branched. August. *l.*, lower ones ovate, obtuse, attenuated to the petioles, undulated; upper ones lanceolate, acute, sessile, decurrent. Stem branched, 5ft. high. Brazil, 1819. Herb. (B. M. 2221, 2555.)

N. longiflora (long-flowered).* *fl.* lateral, solitary, pedicellate, often opposite the leaves, in terminal simple racemes; corolla white at first, afterwards purple or yellowish-green; limb white inside. August. *l.*, radical ones ovate-lanceolate, acute; cauline ones cordate-lanceolate, acuminate. *h.* 3ft. Buenos Ayres, 1832. Herb. (S. B. F. G. ser. ii. 196.)

N. noctiflora (night-flowering). *fl.* white, purplish beneath, odorous at night; corolla tube thrice as long as the calyx. August. *l.* petiolate, oblong-lanceolate, acute, undulate-crisped. Stem 2ft. to 3ft. high. Chili, 1826. Herb. (B. M. 2785; S. B. F. G. 262.)

FIG. 692. NICOTIANA WIGANDIOIDES.

N. persica (Persian). *fl.* in extra-axillary, shortly pedicellate racemes; corolla white within, green without; tube 2½in. long. August. *l.*, radical ones oblong-spathulate, acute, cordate at base; cauline ones sessile. *h.* 3ft. Persia (cultivated), 1831. This herb yields the celebrated Shiraz tobacco. (B. R. 1592.)

N. suaveolens (sweet-scented).* *fl.* white, disposed in loose panicles, fragrant; tube of corolla cylindrical. Summer. *l.* sub-petiolate, ovate-lanceolate, undulate. Stem nearly simple. *h.* 1ft. to 2ft. Australia, 1800. Herb. See Fig. 690. (B. M. 673, under name of *N. undulata*.)

N. Tabacum.* Common Tobacco. *fl.* rose, downy outside; corolla inflated, ventricose; segments of the limb acuminated; racemes short, many-flowered. Summer. *l.* sessile, oblong-lanceolate, acuminated. *h.* 4ft. America, 1570. Plant downy, clammy. Herb. See Fig. 691. (B. M. Pl. 191.)

N. T. fruticosa (shrubby). "This variety differs from the type only in the shrubby base of its stem and its narrower leaves" (Hooker). (B. M. 6207.)

Nicotiana—*continued.*

N. undulata (wavy-leaved). A synonym of *N. suaveolens*.

N. wigandioides (Wigandia-like).* *fl.* yellowish-white, in large drooping panicles; corolla hypocrateriform. *l.* large, ovate-acuminate, pilose. Columbia. Greenhouse shrub, well adapted for sub-tropical gardening. See Fig. 692. (B. H. 1873, 18.)

NICOTINE SOAP. *See* **Insecticides.**

NIDULANT. Nestling; lying as a bird in its nest.

NIDULARIUM. This genus is now regarded, by the authors of the "Genera Plantarum," as a synonym of **Karatas** (which *see*).

N. latifolium. *See* **Canistrum viride.**

N. Lindeni. *See* **Canistrum eburneum.**

NIEREMBERGIA (named after John Eusebius Nieremberg, 1595-1658, a Spanish Jesuit, author of a work on the Marvels of Nature). ORD. *Solanaceæ*. A genus comprising about a score species of mostly half-hardy, elegant, perennial herbs, creeping, diffuse, or rarely almost erect, often slender and glabrous; they are natives of extra- and sub-tropical America. Flowers pale violet or whitish, on solitary pedicels; limb of corolla often elegantly expanding; tube slender, elongated. Leaves entire. The hardy species prefer a light but not very dry soil, and are all easily increased by cuttings, placed in a gentle heat. The species best adapted for growing in cool houses are of comparatively easy culture. They thrive best in a compost of three parts good sandy loam, and one of thoroughly decomposed manure and sharp sand. These kinds should be propagated, during August, by cuttings, which, when well rooted, should be potted off singly and placed for the winter on a light, airy shelf in the greenhouse; only enough water being given to prevent flagging. In February or March, shift into 5in. pots, in which the plants may be allowed to flower, or they may be transferred afterwards to beds or vases outside. Propagated also by seeds, which should be sown in a warm greenhouse during spring or in autumn, and the plants grown on in the way recommended above for cuttings. The undermentioned species are those best known to cultivation.

N. calycina (large-calyxed).* *fl.* yellow at the base, with a yellowish tube and a white limb; peduncles lateral, one-flowered, short. September. *l.* opposite and alternate, roundish-obovate, petiolate. Stems procumbent. Buenos Ayres, 1834. Plant clothed with glandular pubescence. Half-hardy. (B. M. 3371; S. B. F. G. ser. ii. 319.)

N. filicaulis (thread-stemmed).* *fl.* usually lilac, with a yellow centre; tube slender, glandular; peduncles opposite the leaves, one-flowered. May. *l.* linear-lanceolate, acute or obtuse. *h.* 6in. to 12in. Buenos Ayres, 1832. Plant glabrous, erect, filiform. Greenhouse. (B. M. 3370; S. B. F. G. ser. ii. 243.)

N. frutescens (shrubby).* *fl.* delicate blue, shaded to white at the edges, about 1in. in diameter, densely produced on much-branched flax-like stems. Early summer. *l.* linear, 1½in. to 2in. long. *h.* 1ft. to 1½ft. Chili, 1867. A handsome hardy species, with a shrubby habit.

N. gracilis (slender).* *fl.* terminating the young branches; limb white, streaked with purple, with a yellow centre; tube very long. Summer. *l.* linear, sub-spathulate, obtuse. Stems erectish. *h.* 6in. to 12in. Buenos Ayres, 1831. Plant downy, half-hardy. An excellent and very floriferous species, well

Nierembergia—*continued.*

adapted for pot culture and greenhouse decoration. (B. M. 3108; S. B. F. G. ser. ii. 172.)

N. rivularis (brook-loving).* *fl.* white, with a yellowish, and, sometimes, a rosy tinge; corolla bell-shaped, about 1in. across, with a very slender tube, 1in. to 2½in. long. July. *l.* very variable in size, oblong or spathulate, obtuse. Stems much branched and matted, slender, smooth, creeping and rooting. La Plata, 1866. A handsome hardy perennial when well grown; moisture and a little shade being the chief conditions required. In bare places, or the more moist parts of rockwork, it may be grown with capital effect; but the patches should be broad. It also forms a good surfacing subject for leggy plants or shrubs. Propagation is best effected by divisions in spring, just as the new growth commences. (B. M. 5608.)

N. Veitchii (Veitch's). *fl.* pale lilac, with a very slender corolla tube, 1in. long. *l.* ovate-oblong. Stems slender, branching, prostrate. South America, 1866. Greenhouse. (B. M. 5599.)

NIGELLA (a diminutive from *niger*, black; referring to the colour of the seeds). Devil-in-the-Bush; Fennel Flower; Love-in-a-Mist. Including *Garidella*. ORD. *Ranunculaceæ*. A genus comprising about half-a-score species of curious, hardy, erect-growing annuals, inhabiting the Mediterranean region and Western Asia. Flowers white, blue, or yellowish; calyx of five petal-like deciduous sepals; petals five, two-lipped, with a hollow, nectariferous claw. Stem leaves alternate, cut into very narrow, sub-pinnate segments. Nigellas are of the easiest culture in any moderately good garden soil. Seeds should be sown in March or April, in the open border, in light soil, and the seedlings thinned out to 6in. apart. The species most generally grown are *N. damascena* and *N. hispanica*.

FIG. 693. NIGELLA DAMASCENA FLORE-PLENO, showing Habit and detached Flowering Branchlet.

N. damascena (Damascus).* *fl.* white or blue, large, surrounded by a mossy involucre; sepals spreading. Summer. *l.* bright green, finely cut. *h.* 1ft. to 2ft. South Europe, 1570. (B. M. 22.) Of this there is a double-flowered variety, *flore-pleno*. See Fig. 693.

N. hispanica (Spanish).* *fl.* deep blue, with blood-coloured stamens, large, without any involucre. Summer. *h.* 1ft. to 2ft. Spain and Southern France, 1629. (B. M. 1265.)

N. Nigellastrum (Star Nigella). *fl.* brown and green; petals sessile, spreading. July. *l.* very slender. *h.* 1ft. South Europe, 1736. (B. M. 1256, under name of *Garidella Nigellastrum*.)

N. orientalis (Eastern).* *fl.* yellow, spotted with red. Summer. *l.* divided into long narrow segments, pale glaucous green. *h.* 1½ft. Asia Minor, 1699. An inferior species, but very curious in both flower and carpels. (B. M. 1264.)

N. sativa (cultivated). *fl.* bluish, destitute of an involucre. July. *l.*, segments short, linear, diverging. Stem erect, rather hairy. *h.* 1ft. South Europe, North Africa, Asia Minor, 1548. This plant is supposed, by some persons, to be the Fitches mentioned in Isaiah xxviii. 25, 27. See Fig. 694. (S. F. G. 511.)

NIGER. Black.

NIGGER CATERPILLAR. *See* **Turnip Sawfly.**

NIGHTFLOWER. *See* **Nyctanthes.**

NIGHT MOTHS. *See* **Noctua.**

NIGHT-SCENTED STOCK. A common name applied to *Hesperis tristis*, *Mathiola odoratissima*, &c.

NIGHTSHADE. *See* **Solanum.**

FIG. 694. FLOWER-STEM, WITH LEAF, OF NIGELLA SATIVA.

NIGHTSHADE, DEADLY. A common name for *Atropa Belladonna*.

NIGHTSHADE, ENCHANTER'S. *See* **Circæa.**

NIGRESCENS, NIGRICANS. Blackish.

NIGRINA. A synonym of **Melasma** (which *see*).

NIOBE. Included under *Funkia*.

NIPA (its Moluccan name). ORD. *Palmeæ*. A monotypic genus. The species is an ornamental, unarmed, stove palm. This plant is somewhat difficult to grow; its pot should be partially or nearly submerged in a tank in which tropical aquatics are cultivated.

N. fruticans (shrubby). *fl.* monœcious, axillary, enclosed in a spathe. *fr.* drupaceous, angular, one-seeded, aggregated in large heads. *l.* terminal, pinnatisect, often more than 20ft. long; segments lanceolate, acuminate, plicate-nerved, glaucous paleaceous beneath; margin recurved at base. Trunk horizontal, elongated, robust. Estuaries of rivers of tropical Asia and Australia, 1822.

NIPACEÆ. Included under *Palmeæ*.

NIPHÆA (from *niphos*, snow; in allusion to the white flowers). ORD. *Gesneraceæ*. A very small genus (two species) of softly villous, stove, herbaceous plants, of which one is Mexican, and the other a native of Cuba. Flowers white; corolla rotate, broadly five-lobed; tube very short; pedicels fascicled in the axils. Leaves petiolate, ovate, toothed, soft, sub-membranous. Stems dwarf, erect; roots creeping. For culture, *see* **Achimenes.**

Niphæa—*continued.*

N. albo-lineata (white-lined). A synonym of *Phinæa albo-lineata.*

N. oblonga (oblong).* *fl.* white, axillary and terminal, drooping. Winter. *l.* oblong-cordate, toothed, rugose. *h.* 1ft. Guatemala, 1841. (B. R. 1842, 5.)

N. rubida (reddish). A synonym of *Phinæa rubida.*

NIPHOBOLUS. Included under **Polypodium** (which *see*).

NIPHOPSIS. Included under **Polypodium** (which *see*).

NISSOLIA (named after William Nissole, French botanist, Professor at Montpellier, born 1647, died 1735). ORD. *Leguminosæ.* A small genus (only two species) of stove suffruticose herbs, of twining habit, indigenous to tropical America. Flowers yellow, in axillary racemes, or thyrsoid at the tips of the branches. Pods linear. Leaves impari-pinnate; leaflets few, exstipellate; stipules setaceous. Nissolias thrive in a peat and loam compost. Propagated by cuttings of short, stubby, half-ripened shoots, in spring or summer. Probably none of the species are now in cultivation.

NITIDUS. Having an even, smooth, polished surface, as instanced in many seeds.

NITTA-TREE. *See* **Parkia africana.**

NIVENIA (named in honour of James Niven, a botanical collector, especially of African plants). SYN. *Paranomus.* ORD. *Proteaceæ.* A genus comprising a dozen species of large greenhouse, evergreen, erect, leafy shrubs, natives of South Africa. Flowers in terminal or axillary spikes; florets in fours, within a persistent, hairy involucre of four leaves. Leaves simple or much divided, with filiform, sharp-pointed segments. The species require treatment similar to **Protea** (which *see*). The two species here described are probably the only ones yet introduced.

N. crithmifolia (Crithmum-leaved). *fl.* purple; spikes sub-sessile, cylindrical, dense. July. *l.* bi- or tri-ternate, slender, almost filiform, 1in. to 1½in. long. *h.* 4ft. 1810. (A. B. R. 243, under name of *Protea Lagopus.*)

N. media (middle). *fl.* purple; spikes ovate-oblong, terminal, solitary or sub-umbellate. July. *l.* sub-triternate, glabrous, 2in. long. *h.* 2½ft. 1786. (A. B. R. 234, under name of *Protea spicata.*)

NIVEUS. Snow-white; the purest white.

NOCCA. A synonym of *Lagascea.*

NOCCÆA. A synonym of **Lagascea** (which *see*).

NOCTUA (Night Moths). A name applied with a considerable diversity of comprehensiveness in respect to the number of insects included under it, though, even in the widest acceptance, the species are all heavy in body, with somewhat narrow front wings, dull coloured, but variegated with spots and cross bands. Used originally to denote any member of the great group now called *Noctuina,* it became restricted to the family *Noctuidæ,* and finally to the genus *Noctua.* A brief account of the family *Noctuidæ* is here given. The distinctive characters are not easily put into words, yet the general aspect is somewhat easily recognised in the family. The front wings are narrow and laid flat, and so overlap as to render the whole insect narrow when at rest. In most of the species, the spread of wings averages about 1½in., varying from 1in. to 2¼in. The larvæ are usually cylindrical, thick, and smooth, and hide during the day either below ground or in and below the plants on which they feed at night: they are usually dull in colour of markings (see Fig. 695). The pupæ are protected in earthen cocoons underground. The family includes four British genera, viz.: *Rusina* with one species, which has the fore wings brown, with three dark cross lines, and the hind wings dark grey, with darker fringes; *Triphæna* (the Yellow Under-wings), from 1¼in. to 2¼in. in spread of wing, easily

Noctua—*continued.*

known by the hind wings being yellow or orange, with a black band along the rear margin; *Agrotis* (the Dart Moths), and *Noctua,* both of which latter have grey hind wings, and vary from 1in. to 2in. in spread of wings; the chief differences between them resting in the narrower fore wings, and, in *Agrotis,* different arrangements in markings of the fore wings. *Agrotis* numbers twenty-three British species, *Noctua* twenty, and *Triphæna* six. The larvæ of almost all these genera devour herbaceous plants or Willows; and many of them can thrive on a large variety of plants. Some attack the roots, others the leaves and the young stems, of many of our cultivated potherbs; and a considerable proportion may be included among the most hurtful of garden pests. Indeed, this family probably contains the Moths most hostile to gardeners. *Noctua* is, perhaps, the least injurious of the three genera, since few of the larvæ in it are in the habit of feeding largely on garden produce. *Triphæna,* though with fewer species, is probably more

FIG. 695. CATERPILLARS OF TURNIP MOTH (AGROTIS SEGETUM).

destructive; but pre-eminent in this respect is *Agrotis.* In this genus, many of the species live habitually on Turnip roots (*see* **Turnip Moth**), on Cabbages, and on almost all other vegetables grown for food. The most injurious kinds may be specified as the Turnip Moth (*A. segetum*), the Heart and Dart (*A. exclamationis*)—like the last, very destructive to Turnip roots in winter, though omnivorous when pressed by hunger—the Garden Dart (*A. nigricans*), and the White-line Dart (*A. Tritici*); though several of the remaining species are also harmful at times. To attempt to describe the above species individually, would far exceed the space available here.

Amongst the best methods for getting rid of the caterpillars are to lay soot or gas-lime around the stems of the plants, so as to prevent access to them; or to manure with guano, and earth-up the plants, to stimulate repair of injuries caused by the insects. If only a few choice plants are attacked, it is advisable to remove the soil from the upper part of the root, and to pick out

Noctua—*continued.*

the larvæ; or to examine the plants with a lantern at night, and to pick off such as are visible. Those that live in the hearts of the plants cannot be removed without the destruction of the parts in which they lie. In the protection of Turnips, and other field crops, rooks and partridges afford the best aid, though starlings and other birds also eat not a few larvæ.

NODE. That part of a stem from which a leaf, complete or incomplete, arises.

NODOSE, NODULOSE. Having many nodes, or knots.

NODULES. Small hard nodi, or knots.

NOISETTIA (named after Louis Claude Noisette, 1772-1849, an eminent French cultivator of fruit trees, author of "Le Jardin Fruitier"). ORD. *Violarieæ*. A small genus (two species) of erect, almost simple, stove sub-shrubs, inhabiting tropical and Northern sub-tropical America. Flowers in the axils, shortly racemose or fasciculate; pedicels articulated above the middle. Leaves alternate, simple. The species thrive in a thoroughly well-drained compost of sandy loam and leaf mould, and require a light place near the glass. Propagated by cuttings, inserted in sand, under a hand glass, in heat.

N. longifolia (long-leaved). *fl.* cream-coloured or white, in bundles; spur awl-shaped. *l.* lanceolate, serrated, acute, tapering into short footstalks. *h.* 1ft. to 1½ft. Cayenne, 1824.

NOLANA (from *nola*, a little bell; alluding to the shape of the corolla). SYNS. *Neudorfia, Sorema, Teganium*. ORD. *Convolvulaceæ*. This genus consists of about eight species of hardy, glabrous or pubescent, often diffuse or prostrate herbs, natives of Chili and Peru. Flowers whitish, bluish (or pink?), in the axils, shortly pedunculate; calyx campanulate; corolla broad, almost funnel-shaped. Leaves solitary or twin, sessile or petiolate, entire, flat, sometimes slightly fleshy. The species are of easy culture in any moderately good garden soil, and in a sunny situation. Seeds should be sown in the open border during April or May. The species best known to cultivation are the following:

N. atriplicifolia (Atriplex-leaved). *fl.* large; throat white, yellow inside. Summer. *l.* spathulate; radical ones large. Stems procumbent, rather villous. Peru, 1834. SYN. *N. grandiflora*. (S. B. F. G. ser. ii. 305.)

N. grandiflora (large-flowered). A synonym of *N. atriplicifolia*.

N. lanceolata (lanceolate).* *fl.* blue, white, green, solitary in the axils. July. *l.* twin, lanceolate, semi-amplexicaul, obliquely adnate at base. *h.* 6in. Chili, 1860. (B. M. 5327.

FIG. 686. FLOWERING BRANCHLET OF NOLANA PARADOXA.

N. paradoxa (paradoxical).* *fl.*, corolla campanulately funnel-shaped. Summer. *l.* ovate, obtuse, pilose. Stem prostrate, hairy. Chili, 1825. See Fig. 686. (B. R. 865.)

N. paradoxa (paradoxical), of Sims. A synonym of *N. tenella*.

Nolana—*continued.*

N. prostrata (prostrate). *fl.* pale blue. July. *l.* ovate-oblong, twin, rhomboid-ovate, entire. Peru, 1761. (B. M. 731.)

N. tenella (tender).* *fl.* pale blue, with a paler eye, on hairy, filiform peduncles. Summer. *l.* ovate, obtuse at both ends. Stems filiform. Plant clothed with viscid down. Chili, 1824. (B. M. 2504, under name of *N. paradoxa*.)

NOLANACEÆ. Included under *Convolvulaceæ*.

NOLINA (named after P. C. Nolin, a French botanist of the last century). SYN. *Roulinia*. ORD. *Liliaceæ*. This genus is included, by Mr. Baker, under *Beaucarnea*. There are about a dozen species, natives of Mexico, Texas, &c. *N. georgiana* is a showy, half-hardy plant, with a very large tunicated bulb; it would probably prove hardy in favoured localities in Southern counties. Under glass, in a cool house, it thrives in a well-drained sandy-loam compost, and, during the season of rest, water should be sparingly administered. Increased by offsets. *N. longifolia* and *N. recurvata* are described under **Beaucarnea** (which *see*).

N. georgiana (Georgian).* *fl.* whitish, small, disposed on an erect stalk, 2ft. to 3ft. high, and branching at the top into a many-flowered panicle with spreading branches. May. *l.* dry, harsh, toothleted, narrow, strap-shaped. Georgia, 1812. (G. C. n. s., xv. 697.)

NONATELIA. Included under **Palicourea** (which *see*).

NONEA. *See* **Nonnea.**

NONNEA (named after J. P. Nonne, of Erfurt, 1729-1772, a German writer on botany). Sometimes spelt *Nonea*. SYNS. *Echioides, Oscampia*. ORD. *Borragineæ*. A rather large genus (upwards of thirty species have been described) of half-hardy or hardy, annual or perennial, hispid or villous, erect or often diffuse, herbs, natives of Europe, North Africa, and Western Asia. Flowers pink, blue, white, or yellow, erect; cymes at first dense, at length often separating into elongated, leafy-bracted branches; corolla tube cylindrical, lobes imbricated. Leaves alternate. *N. rosea* is probably the prettiest of the two or three species grown in this country. For culture, *see* **Anchusa** (under which several of the species are often classed).

N. rosea (rose-coloured).* *fl.* rose-coloured, with a yellowish-white throat. Summer. *l.* oblong, obtuse. *h.* 6in. to 12in. Asia Minor, &c. Diffuse hardy annual. SYN. *Anchusa latifolia*. *A. versicolor* (B. M. 3477) is a form in which the flowers are red when in bud, but turn a fine blue when fully expanded.

NOONFLOWER. *See* **Tragopogon pratensis.**

NOPALEA (from *Nopal*, the Mexican name for a Cactus). ORD. *Cacteæ*. A small genus (three species) of fleshy, stove shrubs, inhabiting the West Indies, Mexico, and tropical South America, one being largely cultivated in the tropical regions of the globe. The species are allied to *Opuntia*, from which they differ in having erect and connivent, not expanding, petals, and in the stamens being shorter than the style, but longer than the corolla. Flowers scarlet; perianth inclosed. Leaves small, squamiform, on the younger tubercles. Branches articulated; joints compressed, obovate or oblong; tubercles bearing a few small prickles. Nopaleas thrive under conditions which are found suitable for Opuntias, and most other Cacti. A thoroughly well-drained soil, amongst which should be incorporated a fair proportion of lime rubbish (which acts as a draining agent, and also supplies the lime which, in the form of oxalate, is found in such large quantities in the stems of old plants), is all that is needed. Unlimited sunlight, a fair supply of water when in growth, and a less quantity when at rest, complete the necessary conditions.

N. coccinellifera (cochineal-bearing). *fl.* 1½in. in diameter. August. *l.* soon falling off, leaving a white scar and a tuft of short wool and bristles. Stem and older branches ashen-grey, nearly cylindrical, the younger parts being deep green and flat; joints 5in. to 1ft. long. *h.* 8ft. to 10ft. West Indies, 1688. This plant is widely grown as food for the cochineal insects, of which large quantities are reared on it. SYN. *Opuntia coccinellifera* (B. M. 2741, 2742, under name of *Cactus cochinellifer*.)

NORANTEA (altered from *Gonora-antegri*, the Caribbean name of *N. guianensis*). SYNS. *Ascium*, *Schwartzia*. ORD. *Ternströmiaceæ*. A genus consisting of about eight species of handsome stove epiphytal or climbing shrubs, rarely arborescent, confined to tropical America. Flowers disposed in terminal, elongated, many-flowered racemes; petals and sepals five, imbricated; pedicels jointed at the base, furnished with petiolate, cucullate, or saccate bracts. Leaves coriaceous, entire. The species (of which the two here described are probably the only ones yet introduced) thrive in a compost of loam and peat. Propagated by ripened cuttings, which root freely in sand, under a glass, in heat.

N. braziliensis (Brazilian). *fl.* green in the middle, but white on the margins, racemose, on long peduncles; bracts scarlet. *l.* obovate, stalked. *h.* 6ft. Brazil, 1820. Climber.

N. guianensis (Guiana). *fl.* violet, nearly sessile, on long spikes; bracts large, bladdery or cucullate, scarlet. *l.* oblong, mucronate, coriaceous. Branches red, throwing out roots, by which it supports itself on trees near which it grows. Guiana, 1818. A beautiful species. (A. G. 220.)

NORFOLK ISLAND PINE. *See* **Araucaria excelsa.**

NORNA. A synonym of *Calypso*.

NORWAY MAPLE. *See* **Acer platanoides.**

NORWAY SPRUCE. *See* **Picea excelsa.**

NOTELÆA (from *notos*, south, and *Elaia*, the Olive; in allusion to the form and native place of the species). SYN. *Rhysospermum*. ORD. *Oleaceæ*. A genus comprising eight species of Australian, greenhouse evergreen shrubs or trees, with the habit of Olive, only three of which, probably, have yet been introduced. Flowers in short, fasciculate, axillary racemes; petals four, broad, obtuse, free, or connected by pairs to the filaments at the base. Drupe globose, ovoid or oblong. Leaves opposite, entire. The species thrive in a compost of peat and loam, with a little sand and charcoal added. Propagated, in April, by cuttings of firm side shoots, inserted in sand, under a bell glass, without heat.

N. longifolia (long-leaved). *fl.* white, small; racemes rarely 1in. long. March to June. *fr.* ovoid or globular, dark-bluish. *l.* lanceolate, reticulately veined on both surfaces, more or less downy beneath, dotless, 2in. to 6in. long. 1790. Tall shrub. SYN. *Olea apetala* (A. B. R. 316).

N. ovata (ovate). *fl.* similar to those of *N. longifolia*; racemes few-flowered. June. *fr.* like that of *N. longifolia*. *l.* very shortly petiolate, ovate or broadly ovate-lanceolate, obtuse or acute, rounded or contracted at base, 1½in. to 2in. long. 1824. Shrub.

N. punctata (dotted). *fl.* as in *N. longifolia*. June. *fr.* ovoid, smaller than that of *N. longifolia*. *l.* oblong-lanceolate, 2in. to 3in. long, tapering into a rather long petiole, reticulate above, densely dotted beneath. 1826. Shrub.

NOTHOCHLÆNA (from *nothos*, spurious, and *chlaina*, a cloak; some of the species appear to have involucres). Frequently, but incorrectly, spelt *Nothoclæna*, or *Notholæna*. Including *Cincinalis*. ORD. *Filices*. A genus comprising about thirty-four species of wide-spread, ornamental stove or greenhouse ferns, differing from *Cheilanthes* only by the absence of a distinct involucre, and connected with it by gradual intermediate changes. The species should be grown slightly elevated above the rim of the pot, and in a compost of fibrous peat, silver sand, and small pieces of sandstone. Thorough drainage is most essential; and the fronds should not be wetted. For general culture, *see* **Ferns.** Except where otherwise stated, all the species here described require greenhouse treatment.

N. candida (white). A synonym of *N. sulphurea*.

N. chrysophylla (golden-fronded). A garden synonym of *N. flavens*.

N. distans (distant). *sti.* densely tufted, 1in. to 3in. long, wiry. *fronds* 6in. to 9in. long, ¾in. to 1in. broad, bipinnate; pinnæ often much curled together, the lower ones distant, deltoid, cut down to the rachis into oblong, obtuse, entire or slightly lobed pinnules; lower surface and rachis scaly. Australia, &c.

N. Eckloniana (Ecklon's).* *rhiz.* woody, densely scaly. *sti.* 3in. to 6in. long, strong, erect, scaly. *fronds* 6in. to 12in. long, 2in. to

Nothochlæna—*continued.*

3in. broad, bi- tripinnatifid; upper pinnæ close, the lower ones sub-distant, deltoid; pinnules close, lanceolate, pinnatifid or pinnate, with short, oblong segments; lower surface and rachis densely scaly. Cape Colony, &c., 1838. A handsome but very rare species.

N. ferruginea (rusty). *rhiz.* thick, bearing bulb-like scaly buds. *sti.* sub-tufted, 2in. to 4in. long, wiry, erect, slightly matted. *fronds* 6in. to 12in. long, ½in. to 1in. broad, simply pinnate; pinnæ sessile, ¼in. to ½in. long, ovate, deeply pinnatifid, with blunt lobes; upper surface pale green, villous; lower densely tomentose; edge inflexed. *sori* black. West Indies, Mexico.

N. flavens (yellow).* *sti.* densely tufted, 4in. to 8in. long, naked. *fronds* 4in. to 9in. long, 2in. to 4in. broad, oblong-deltoid, tripinnate; pinnæ distant, the lower ones deltoid; the pinnules stalked, with oblong segments, 1in. to 1½in. broad; lower surface densely coated with bright yellow powder. *sori* brown, extending from the edge nearly to the midrib. Central America. An elegant stove species, known in gardens sometimes as *N. chrysophylla*. SYNS. *Cincinalis flavens* and *Gymnogramme flavens*.

FIG. 697. FROND OF NOTHOCHLÆNA NIVEA HOOKERI.

N. hypoleuca (white beneath).* *rhiz.* bulbiferous, with dark brown scales. *sti.* tufted, slender, 2in. to 4in. long. *fronds* 6in. to 6in. long, about 1in. broad, bipinnatifid; pinnæ ½in. to ¾in. long, ¼in. to ⅜in. broad, ovate, cut down nearly or quite to the rachis below into blunt lobes, naked and pale green above, densely tomentose beneath; edge slightly inflexed. Chili.

N. lanuginosa (woolly).* *sti.* densely tufted, woolly, wiry, very short. *fronds* 6in. to 9in. long, 1in. to 1½in. broad, oblong-lanceolate, bipinnate; pinnæ close, lanceolate, the central ones the largest, with close, roundish or oblong, entire or three-lobed pinnules; rachis more or less woolly. South Europe, Australia, 1778. A very handsome species, distinguished from the rest by its dense white woolly tomentum.

Nothochlæna—*continued.*

N. Marantæ (Maranta's).* *rhiz.* woody, with dense fibrillose scales. *sti.* strong, wiry, 3in. to 6in. long, more or less matted. *fronds* 4in. to 12in. long, 1½in. to 3in. broad, oblong-lanceolate, bipinnate; pinnæ lanceolate, cut down to the densely scaly rachis into close, oblong, entire pinnules, one line broad. South Europe, Himalayas, North Africa, &c.

N. mollis (soft). *rhiz.* woolly, thick, with black scales. *sti.* 2in. to 3in. long, strong, erect, matted. *fronds* 8in. to 12in. long, 1½in. to 2in. broad, tripinnate; upper pinnæ close; lower ones distant, lanceolate, with a thick rachis, and often up-curled; segments small, roundish; upper surface dark green, naked; lower surface and rachises woolly. Chili and Andes of Guatemala.

N. Newberryi (Newberry's). *sti.* tufted, 3in. to 5in. long. *fronds* 3in. to 5in. long, lanceolate-oblong, three- or four-pinnate; ultimate segments obovate, crowded, one-third to half a line broad, entire or sub-crenate, both sides covered with a dense white tomentum of slender entangled hairs, more dense below. *sori* rather large, at last emergent from the tomentum. California.

N. nivea (snowy).* *sti.* densely tufted, 4in. to 6in. long, scaly. *fronds* 3in. to 6in. long, 1½in. to 2in. broad, ovate, tripinnate; pinnæ distant, the lower ones deltoid; pinnules long-stalked, with blunt, oblong, or roundish terminal segments, one to two lines long and half a line to one line broad; lower surface coated with pure white powder. *sori* brown. Andes, from Mexico to Peru. A handsome species.

N. n. Hookeri (Hooker's).* "A form known only in cultivation, with close dilated segments and sessile pinnules" (Baker). See Fig. 697.

FIG. 698. FROND OF NOTHOCHLÆNA SINUATA.

N. sinuata (sinuated). *rhiz.* very thick, densely scaly, and bulbiferous. *sti.* sub-tufted, 2in. to 4in. long, firm, erect, matted.

Nothochlæna—*continued.*

fronds 1ft. to 2ft. long, 1in. to 2in. broad, simply pinnate; pinnæ short-stalked, ½in. to 1in. long, ¼in. to ½in. broad, ovate or oblong, varying from entire to deeply pinnatifid; rachis densely scaly; edge slightly inflexed. Mexico, 1831. A handsome stove exhibition fern. See Fig. 698. (B. M. 4699.) Texas to Peru

N. squamosa (scaly). *sti.* tufted, 1in. to 4in. long, densely scaly. *fronds* 3in. to 4in. long, 1in. or more broad, ovate-lanceolate, bipinnate; pinnæ opposite, the lowest ½in. long, ¼in. broad, ovate, blunt, cut down to the rachis below into several linear-oblong pinnules; rachis and under surface densely scaly. *sori* brownish; the edge sub-scariose. Mexico to Argentine territory, &c.

N. sulphurea (sulphurous). *rhiz.* creeping, the scales dense, rigid, linear, nearly black. *sti.* tufted, 4in. to 6in. long, wiry, naked. *fronds* 2in. to 3in. each way, deltoid; upper pinnæ simple, central ones lanceolate, cut down to the rachis at the base into oblong lobes; lowest pair with the lowest pinnules much prolonged, ½in. or more long, pinnatifid or pinnate; lower surface coated with white or yellow powder. *sori* black. California, &c. SYNS. *N. candida*, *Cheilanthes pulveracea*, and *Cincinalis sulphurea*.

FIG. 699. FROND OF NOTHOCHLÆNA TRICHOMANOIDES.

N. trichomanoides (Trichomanes-like).* *rhiz.* thick, bulbiferous, the scales black. *sti.* tufted, 2in. to 4in. long, firm, erect, slightly scaly. *fronds* 6in. to 12in. long, ¾in. to 1½in. broad, simply pinnate; pinnæ sessile, ovate-oblong, blunt, pinnatifid, with blunt lobes; lower surface clothed with white powder and fine ferruginous woolly hairs; the edge inflexed. Jamaica and Cuba, 1844. A very beautiful stove species, and one of the best for growing in a basket. See Fig. 699.

NOTHOCLÆNA. *See* **Nothochlæna.**

NOTHOLÆNA. *See* **Nothochlæna.**

NOTHOLIRION. Included under **Lilium** (which *see*.)

NOTHOSCORDUM (from *nothos*, spurious, and *Scordon*, Garlic; in reference to the near relationship which exists between this genus and *Allium*). Including *Caloscordum*. SYNS. *Hesperocles*, *Oligosma*, *Pseudoscordum*. ORD. *Liliaceæ*. A genus comprising some half-a-score species of greenhouse or hardy bulbous plants, of which one is Chinese, and the rest are found in extra-tropical America and in the Andes region. Flowers in terminal, many-flowered umbels, with the pedicels not articulated; perianth marcescent, persistent; segments six, connate at base or in the middle, in many cases spreading or campanulate-connivent. Leaves radical, linear, flat. Bulbs tunicated. For culture, *see* **Allium** (in which, and in *Milla*, the species of this genus are, by some authorities, distributed).

N. aureum (golden). A synonym of *Bloomeria aurea*.

FIG. 700. NOTHOSCORDUM FRAGRANS, showing Habit and detached Single Flower.

N. fragrans (fragrant).* *fl.* white, with a bar of very pale lilac on the outer side of each division, fragrant, in umbels of from six to twenty. Summer. *l.* linear-lanceolate. *h.* 1½ft. to 2ft. North America, 1822. A vigorous and handsome hardy species. SYN. *Allium fragrans*. See Fig. 700. (B. R. 898.)

N. inodorum (inodorous). *fl.* whitish, with brownish-purple streaks, scentless; umbel lax, six to twelve-flowered. April and May. *l.* all radical, narrow-lorate. Stem 1½ft. high. Carolina, 1770. Hardy. (B. M. 1129, under name of *Allium inodorum*.)

N. macrostemon (large-stamened). *fl.* six to twenty to an umbel; perianth pale lilac or whitish, ½in. to ¾in. deep, the base a green cup; pedicels erect; anthers yellow; scape 1½ft. to 2ft. long. Summer. *l.* developed with the flower, numerous, sub-erect, fleshy, narrow-linear, 9in. to 12in. long. Buenos Ayres, 1875. Half-hardy. SYN. *Milla macrostemon*.

N. neriniflorum (Nerine-flowered). This is the correct name of the plant described in this work as *Caloscordum nerinæflorum*.

N. striatellum (slightly-striped). *fl.* greenish-yellow, umbellate; petals ovate, acute, striated; peduncles erect. May. *l.* linear. Chili. Half-hardy. (B. M. 2419, under name of *Ornithogalum gramineum*.)

N. striatum (striated-leaved). *fl.* white; segments six, lanceolate, spreading. May. *l.* 7in. to 8in. high, radical, upright, linear-lorate, striated. *h.* 8in. North-west America, &c. Hardy. (B. M. 1035 and 1524, under name of *Allium striatum*.)

NOTIOPHRYS. A synonym of **Platylepis** (which *see*).

NOTOSPARTIUM (from *notos*, Southern, and *Spartium*, Broom; in reference to the Broom-like appearance of the plant, and its being a native of the Southern hemisphere). ORD. *Leguminosæ*. A most curious monotypic genus, the species being a beautiful and interesting, half-hardy or greenhouse, leafless shrub or small tree, of Broom-like habit. "This, the 'Pink Broom' of the residents in the Middle Islands of New Zealand, is one of the most beautiful plants in the Colony, and is further remarkable as being a member of what is one of the largest families of plants in every part of the world, except New Zealand. Indeed, the

absence of *Leguminosæ* in New Zealand, in contrast especially with their great abundance in Australia, is the most singular feature in the Flora of the Island" (Hooker). It succeeds in a peaty soil, but can also be well grown in turfy loam. No doubt the plant will prove quite hardy in many places in Southern Britain.

N. Carmichæliæ (Carmichael's).* *fl.* pink, rather small, in many-flowered racemes; calyx campanulate, truncate; standard obovate-obcordate, not auricled at the base; wings oblong, with an incurved auricle at the base, shorter than the keel. Branches slender; branchlets pendulous, whipcord-like. *h.* sometimes 20ft. 1883. (B. M. 6741.)

NOTYLIA (from *notos*, the back, and *tylos*, a hump; referring to a singular lump on the column). ORD. *Orchideæ*. A small genus of low, stove, tropical American orchids. About eighteen species have been described; but probably several of these are merely varieties. Flowers mostly inconspicuous, racemose; sepals narrow, erect, or almost spreading; lip unguiculate and quite entire. Few of the species are seen under cultivation. They do best in small baskets full of peat fibre, potsherds, and sphagnum, or attached to a piece of teak with a little fresh sphagnum wired over base of plant.

N. albida (whitish). *fl.* greenish-yellow, small, disposed in dense pendulous racemes 6in. long. April. *l.* cuneate-ligulate, oblong, obtuse, acute. Pseudo-bulbs cæspitose, small, compressed, one-leaved. *h.* 6in. Central America, 1851. (B. M. 6311.)

N. bicolor (two-coloured). *fl.*, sepals white; petals lilac, with blue spots at base, wider than the sepals; lip same colour as petals, free; spikes drooping, 2in. to 3in. long. *l.* about five, equitant, stiff, scimitar-shaped, half the length of the flower-spikes. Guatemala, 1866. (B. M. 5609.)

N. bipartita (bipartite). *fl.* numerous, similar to those of a Dendrochilum. Mexico, 1880.

N. punctata (dotted). *fl.* yellow, green; sepals and petals obtuse; lip obcuneate, unguiculate, acute, callous at base. *h.* 6in. Trinidad, 1822. (B. R. 759, under name of *Pleurothallis punctata*.)

NUCLEUS. The central part of the ovule in which the embryo is engendered.

NUNNEZHARIA. *See* **Chamædorea.**

NUNNEZIA. *See* **Chamædorea.**

NUPHAR (from *Naufar*, or *Nyloufar*, the Arabic name of *Nymphæa*). ORD. *Nymphæaceæ*. A small genus (three or four species) of very beautiful aquatic, perennial herbs, inhabiting the extra-tropical regions of the Northern hemisphere. Flowers yellowish, rather large; calyx of five or six concave, coriaceous sepals; petals many, small; stamens numerous, in several rows, ultimately bent backwards. Leaves peltate, floating. Nuphars are perfectly hardy, and thrive either in still or in running water. Although they are sometimes found at much greater depths, they perhaps succeed best when their stout rootstocks are planted in mud, with from 6in. to 12in. of water above them. If the roots are fastened inside loosely-made wickerwork baskets of rich soil, and these placed under water in the spots where it is desired to have the plants grow, no difficulty will be experienced. Unless the newly-planted rootstocks are firmly fixed, they frequently float to the surface of the water; but, when treated as above suggested, the roots soon form and fix themselves in the mud outside the baskets in which they have been placed. *N. pumilum* is a charming little plant, a much smaller grower than either *N. advena* or *N. luteum*, and, therefore, suitable for small pieces of water where those species would prove too large. All should be planted in full sun, as, although the plants grow freely enough in shade, they only produce flowers when allowed the full benefit of sunlight.

N. advena (stranger).* *fl.* yellow, with red anthers, large, on round stalks; sepals six; petals many, small, shorter than the sepals, never exceeding the stamens. Summer. *l.* erect, cordate, with divaricated lobes, on half-round petioles. The leaves and flowers of this species rise considerably above the surface of the water. 1772. (B. M. 684, under name of *Nymphæa advena*.)

N. Kalmiana (Kalm's). A synonym of *N. pumilum*.

Nuphar—*continued.*

N. luteum (yellow).* Yellow Water Lily. *fl.* yellow, with a brandy-like scent, on stalks rising a little above the surface of the water; sepals five; petals very numerous; stigmas entire, ten to thirty-rayed, profoundly umbilicated. Summer. *l.* 8in. to 12in. across, orbicular, deeply two-lobed at base; lobes usually contiguous. The rootstock abounds in tannic acid. See Fig. 701. (Sy. En. B. 54.)

FIG. 701. NUPHAR LUTEUM.

N. pumilum (dwarf). *fl.* ½in. to 1in. across when fully outspread; stigma rays eight to ten, reaching the margin. *l.* oblong, deeply two-lobed at the base; lobes at length spreading. SYN. *N. Kalmiana.* (B. M. 1243, under name of *Nymphæa Kalmiana*; Sy. En. B. 56.)

NUT. *See* **Corylus.**

NUT. A hard, indehiscent pericarp, usually containing only one seed.

NUTANS. Nodding; *e.g.*, the flowers of the Snowdrop.

NUTMEG. *See* **Myristica fragrans.**

NUTMEG, CALABASH. *See* **Monodora Myristica.**

NUTTALLIA, of Torrey and Gray (named after Thomas Nuttall, a celebrated North American botanist; he died in 1859). ORD. *Rosaceæ.* A monotypic genus. The species is a small, ornamental, hardy, deciduous shrub, growing freely in almost any garden soil, and, where seeds cannot be procured, is easily increased by means of the suckers which spring plentifully from the roots.

N. cerasiformis (Cerasus-like).* *fl.* white, small, polygamo-dicecious, in axillary, drooping racemes; stamens fifteen. Early spring. *fr.* Plum-like, with a purple bloom. *l.* obovate, entire. *h.* 5ft. California, 1848. An extremely pretty plant, of nearly globose habit, branching freely, and producing flowers in abundance. (G. C. n. s., xix. 309.)

N. cordata. *See* **Callirhoe triangulata.**

N. digitata. *See* **Callirhoe digitata.**

N. Papaver. *See* **Callirhoe Papaver.**

NUTTALLIA (of De Candolle). A synonym of **Nemopanthes** (which *see*).

NUT-TREE. The common name for **Corylus Avellana** (which *see*).

NUT-WEEVIL (*Balaninus nucum*). It has probably occurred to most persons, when eating Hazels or Filberts, to find some of the shells filled with a black, nauseous powder, instead of with the healthy kernel; or, occasionally, a fat, white maggot may be found feeding on the kernel. The cause of these disappointments is the Nut-Weevil, a curious-looking beetle (see Fig. 702), remarkable for the length and slenderness of its beak, on the middle of which are situated the antennæ. The beetle is about ⅓in. long. The body is egg-shaped; it is dark brown or black, but is covered with grey, yellowish-grey, or white hairs, which form irregular, oblique, paler spots on the shoulders, and on the wing-covers. The hairs can be readily rubbed off, leaving the dark ground colour visible The beak is red-brown; it is a little thickened towards the tip, but beyond the antennæ it curves downwards, slightly in the male, strongly in the female. The antennæ have a long joint

Nut-Weevil—*continued.*

at the base, followed by a number of short ones; the end ones are thicker, so that they form a knob at the tip. There is a sharp bend, like an elbow, formed just at the tip of the long joint (see Fig. 702).

In June, when the nuts are about half-grown, the female Weevils may be found boring holes in the still soft nutshell. One egg is laid in each nut, and it is pushed, by aid of the long beak, into the nut. The hole very quickly closes up, and hardly a scar even can be detected. From the egg emerges a little grub, which feeds upon the seed or kernel, and leaves, in its stead, only a mass of dark, powdery excrement. The grub is yellowish-white, wrinkled, and footless, and lies curled round on one side. Its head is small, and yellowish-brown. When full-fed, it eats a round hole through the shell of the nut, falls to the earth, and burrows under it, there to become a pupa. The beetles emerge from the soil in May of the following year; and, for a time, they feed on the young buds of the Hazel-bushes.

Remedies. When the nuts are attacked, the grubs cannot be detected or removed, except when the nuts fall from the bushes. The latter should be well shaken during the autumn, occasionally; and all the nuts that fall should be gathered and burned, before the grubs come out. In April, and the beginning of May, gas-lime

FIG. 702. NUT-WEEVIL AND GRUB.

or soot may be scattered below the bushes, in preparation for the beetles coming up from the soil. Beating the bushes in *dull* weather will cause the beetles to fall from the branches; and tarred boards, or other appliances, to prevent their escape, should be placed below, to receive them when they fall; or they may be swept up *at once* from cloths laid on the soil. It is well not to allow wild Hazel-bushes to grow near plantations of cultivated Hazels or Filberts.

NUYTSIA (named after Peter Nuyts, a celebrated Dutch navigator, and discoverer of that part of Australia called Nuytsland). Fire-tree. ORD. *Loranthaceæ.* A monotypic genus. The species is a very glabrous, showy, greenhouse tree, differing much from its near allies, *Loranthus*, &c., in being terrestrial and not parasitical. It would probably thrive in a compost of sandy peat and fibry loam; but, so far, it is believed, the plant has not been successfully grown in this country.

N. floribunda (many-flowered). *fl.* orange; racemes 6in. to 8in. long, crowded at the tops of the branches, simple; peduncles longer than the flowers, bearing each three bracts and three flowers at the apex; corolla nearly 1in. long. *l.* alternate, linear, obtuse, thick, 2in. to 3in. long. Branches terete. *h.* 15ft. to 25ft. South-west Australia.

NYCTAGINEÆ. An order of herbs, rarely shrubs or trees, inhabiting tropical and warm regions, mostly America, rarely found in Australia, very rare in Africa. Flowers hermaphrodite, rarely unisexual, regular, frequently disposed in paniculate or corymbose terminal and axillary cymes, very rarely solitary or racemose, sometimes umbellulate or capitate, often with a calyciform involucre; perianth small or minute, or rarely rather large, obscure or coloured; stamens one to many, hypogynous. Fruit various. Leaves opposite and alternate, sessile or stalked, simple, entire, penniveined. The roots of this order are endowed with purgative or emetic qualities; that of *Mirabilis Jalapa* (false Jalap) has the nauseous smell of the true Jalap, with which it was long confounded. The order comprises twenty-three genera and about 215 species. Examples are: *Abronia, Bougainvillea, Mirabilis, Nyctaginia.*

NYCTANTHES (from *nyx, nyctos*, night, and *anthos*, a flower; in allusion to the flowers opening at the approach of night, and falling off at the break of day). ORD. *Oleaceæ*. A monotypic genus. The species is an erect, spreading, stove shrub, or small tree, thriving in a compost of sandy loam and fibry peat, to which may be added a small quantity of sand and charcoal. Propagated, in May, by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in bottom heat.

N. arbor-tristis. Tree of Sadness. *fl.* white, numerous, very fragrant, disposed in a large, terminal, leafy, cross-armed panicle, composed of small, five-flowered, terminal umbellets; corolla salver-shaped. July. *l.* on short petioles, cordate, acuminated, entire or coarsely serrated, scabrous. Branches tetragonal. *h.* 10ft. to 18ft. India, 1781. (B. M. 4900; B. R. 399.)

NYCTERINIA. A synonym of **Zaluzianskia** (which *see*).

NYCTERIUM. Included under **Solanum** (which *see*).

NYCTOCALOS (from *nyx, nyctos*, night, and *kalos*, beautiful; referring to the flowers and time of opening of the first-discovered species). ORD. *Bignoniaceæ*. A small genus (three species) of stove, scandent, tall shrubs, of which but one species is as yet introduced. The other two are natives of the Malayan Archipelago. Flowers few, on long peduncles; corolla tube very long, cylindrical; limb spreading, or two-lipped; lobes five, orbiculate. Leaves opposite, trifoliolate; leaflets entire, petiolulate. The species described below succeeds best when planted out in well-drained turfy loam and sand in the stove, and its long shoots trained near the glass in full light.

N. Thomsoni (Thomson's). *fl.* white, expanding at night and dropping the next morning; peduncles pendulous, bearing terminal cymes; corolla with a long, narrow, ascending tube, 7in. long, and a broad, Gloxinia-like, oblique limb. *l.* trifoliolate. Assam, 1868. (B. M. 5678.)

NYLANDTIA. A synonym of **Mundtia** (which *see*).

NYMPHÆA (from *nymphe*, a water-nymph; in reference to the habitation of the plants). Water Lily. SYN. *Castalia*. ORD. *Nymphæaceæ*. A rather large genus (about a score species) of handsome stove, greenhouse, or hardy aquatics, with a fleshy or tuberous rootstock. They are mostly distributed over the Northern hemisphere or the tropical regions, a few being found in South Africa or Australia. Flowers white, blue, or red, showy, solitary; sepals four, girding the base of the torus; petals numerous, adnate to the torus. Leaves large, profoundly cordate, or peltate, floating. The cultivation of Water Lilies is by no means difficult. The hardy ones may be planted on hillocks of turfy loam, decomposed manure, and rough sand, so that the crown remains from 6in. to 12in. below the surface of the

Nymphæa—*continued.*

water. Where it is impracticable to make a hillock, place the tubers in baskets of rich soil, and submerge these in the places where the plants are intended to grow. The stove species thrive in large pots, wherein a similar mixture of soil to the above should be used, but they require a house temperature of from 65deg. to 75deg., and the water heated to about the last-named figure; though several will succeed if kept much cooler. A full exposure to all the sun and light possible is recommended, supposing other plants grown in the house will bear it as well as the Nymphæas. As the leaves ripen, gradually lower the temperature of the water and the house, and allow the tubers to remain in the water until the time for repotting comes round—the following March. Some growers even dry off the roots, by gradually withdrawing all the water, and just keeping the soil moistened now and then, to prevent dry-rot, &c. Probably the first-named plan is the best. Propagated by seeds, which, in most cases, ripen freely. They should be sown in small pots of soil, and submerged in a shallow warm-water tank, in spring. The seedlings will grow away freely, if properly treated, and will flower well the same season.

N. advena (stranger). A synonym of *Nuphar advena*.

N. alba (white).* Common White Water Lily. *fl.* white, scentless, floating on the surface of the water, 4in. to 6in. across; sepals four; petals from sixteen to twenty-four, in two or three rows, the outer ones having a green streak along the back. Summer. *l.* deeply cordate, entire, smooth. Europe (Britain), &c. See Fig. 703. Of this beautiful hardy species there is a very pretty rosy-pink variety, known as *rosea*. (R. H. 1879, 230, under name of *N. Caspary*.)

FIG. 703. NYMPHÆA ALBA.

N. amazonum (Amazon). *fl.* 3in. to 4in. in diameter, very fragrant; sepals yellow-green, purple at base; petals yellowish-white. *l.* sub-orbicular, cordate, obtuse, entire or sinuate-toothed, usually reddish beneath, 4in. to 12in. long. Jamaica. Greenhouse. (B. M. 4823.)

N. ampla (large), of Hooker. A synonym of *N. ampla speciosa*.

N. a. speciosa (showy). *fl.*, petals white or yellowish-white; exterior stamens much longer than the interior ones. July. *l.* cordate and a little peltate, sinuate-toothed, glabrous, usually purple beneath. Jamaica, 1801. Stove. (B. M. 4469, under name of *N. ampla*.)

N. cærulea (blue). A synonym of *N. stellata*.

N. Caspary (Caspary). A synonym of *N. alba rosea*.

N. dentata (toothed). A synonym of *N. Lotus dentata*.

N. Devoniensis (Duke of Devonshire's).* *fl.* brilliant rosy-red, from 5in. to 6in. across. Spring to winter. *l.* large, peltate. A most beautiful stove hybrid, between *N. Lotus* and *N. rubra*. (B. M. 4665; P. F. G. iii. 98.)

N. elegans (elegant). *fl.* fragrant, the size of the common Water Lily; sepals pale green, yellowish at base, and streaked with deep brown; petals twelve to fourteen, yellowish-white, tinged with purplish-blue; both oblong and obtusely acuminated. June. *l.* floating, about 6in. long, 4½in. to 5in. broad, purple beneath. New Mexico, 1850. Stove. (B. M. 4604.)

N. flava (yellow). *fl.* canary yellow, of medium size. Summer. *l.* oblong orbicular, shallowly crenate, with slightly diverging, somewhat prolonged auricles at the base, irregularly blotched with a bronzy colour, especially in the early part of the season. Blade 4in. to 6in. long, and 3½in. to 5in. broad. Rhizome slender, forming numerous suckers. This species never becomes thoroughly deciduous, and, therefore, should never be dried off. South United States, 1881. Nearly hardy.

Nymphæa—*continued.*

N. gigantea (gigantic).* *fl.* of a beautiful blue, 6in. to 7in. across, with numerous petals and a dense mass of deep golden-coloured stamens, which form a striking contrast. Summer. *l.* peltate, smooth, dark green. Australia, 1852. A handsome greenhouse or stove species. (B. M. 4647.)

N. Kalmiana (Kalm's). A synonym of *Nuphar pumilum.*

N. Lotus.* Egyptian Lotus. *fl.* red or white, with the sepals red at the margins, large. Summer. *l.* peltate, sharply serrated; under surface pilose at the nerves, and pubescent between them. Tropics of Old World, 1802. Stove. This is the Lotos, which was celebrated by the ancient Egyptians, sacred to Isis, and was sometimes engraven on their very ancient coins. It is not to be confounded with the Lotos of the Lotophagi, which is supposed to be *Zizyphus Lotus.* The seeds, dried and ground, were made into a kind of bread by the ancient Egyptians, as were also the roots. Fig. 704 represents an abnormal condition, which appeared in the Paris Botanic Garden some years ago. From the axils of some of the floral leaves of an otherwise normal flower, have developed five flower-stalks (two being united), each bearing another flower; a very strange and interesting instance of prolification. (A. B. R. 503; B. M. 1280 and 1364, under name of *N. rubra.*)

N. L. dentata (toothed).* *fl.* pure white, very large, from 6in. to 14in. in diameter, many-petaled, produced in great profusion in autumn. *l.* peltate, very large, serrated at the margins, often 2ft. in diameter. Sierra Leone, 1845. A magnificent variety. (B. M. 4257, under name of *N. dentata.*)

N. Lotus (Lotus), of Sims. A synonym of *N. thermalis.*

N. micrantha (small-flowered). *fl.* smaller than the common Water Lily; sepals four, pale yellowish-green; petals many, white or whitish. August. *l.* elliptic-rotundate, tinged underneath with pale purplish-brown. West Africa. Stove. (B. M. 4535.)

N. nitida (shining). *fl.* white, scentless, smaller than those of *N. odorata*; petals blunt. June. *l.* cordate, quite entire, nerves not prominent on the under surface; petioles smooth. Siberia. 1809. Hardy. (B. M. 1359.)

N. odorata (sweet-scented).* *fl.* white, tinged with red, sweet-scented, about 6in. across, expanding in the morning, but closing after noon; petals blunt. Summer. *l.* cordate, quite entire, with the nerves and veins on the under surface very prominent. North America, 1786. A handsome hardy species, very like *N. alba*, but quite distinct. (A. B. R. 297; B. M. 819.) There is a very handsome variety, with flowers faintly tinged with pink, called *rosea.*

N. pygmæa (pigmy).* *fl.* white, fragrant; petals acute; torus greenish-yellow. June to September. *l.* cordate, quite entire, nerves not prominent; petioles smooth. Central and Northern Asia, 1805. An elegant little hardy species. (B. M. 1525.)

N. rubra (red). A synonym of *N. Lotus.*

N. scutifolia (shield-leaved).* *fl.* bright blue, sweet-scented. Summer. *l.* peltate, bluntly and sinuately toothed, not dotted, smooth on both surfaces, two-lobed at the base; lobes incumbent. Cape of Good Hope, 1792. A handsome greenhouse or stove species, distinguished from *N. stellata* by its much larger and many-petaled flowers, and by the petals being more obtuse. (F. d. S. vi. 645.)

N. stellata (starry).* *fl.* blue, very delicately scented, produced in abundance throughout the summer months. *l.* peltate, nearly entire, without dots, glabrous on both surfaces, two-lobed at the base. Tropical Africa, 1812. A beautiful stove plant, which was probably held sacred by the Egyptians, and frequently represented on their old monuments and in hieroglyphics. (B. M. 552, under name of *N. cærulea.*)

N. s. cyanea (blue). Indian Blue. *fl.* blue. June to September. *l.* peltate. India, 1809. Stove. (B. M. 2058.)

N. s. versicolor (various-coloured). *fl.* white, changing to red; several of the outer petals are green, and furrowed on the back with green lines. Summer. *l.* peltate, with the margin and between the recesses sinuately toothed, full of pustules, glabrous on both surfaces. Bengal, 1807. Stove. (B. M. 1189, under name of *N. versicolor.*)

N. s. zanzibarensis (Zanzibar).* *fl.* intense blue; anthers with a shade of violet; sepals green outside and purple within. Summer. Zanzibar, 1880. Stove. This is one of the most free flowering and beautiful of all the Water Lilies.

FIG. 704. NYMPHÆA LOTUS, with Abnormal Inflorescence.

N. Sturtevantii (Sturtevant's).* A handsome garden variety, of American origin; a very floriferous large-flowered stove plant, with lighter-coloured blossoms than its parent, *N. Devoniensis.*

N. thermalis (hot-bath).* Hungarian Lotus. *fl.* pure white, having a somewhat vinous odour, very freely produced during summer. *l.* peltate, sharply toothed, glabrous on both surfaces. Hungary, in the warm river Pecze, 1802. Stove. (B. M. 797 under name of *N. Lotus*; F. d. S. vii. 706, 707.)

N. tuberosa (tuberous). *fl.* 4in. to 7in. across, very faintly scented; sepals and petals as in *N. alba* and *N. odorata.* July and August. *l.* circular, 8in. to 18in. in diameter, with an entire or undulated margin. Rootstock creeping, bearing oblong tubers. North-eastern United States. Hardy. (B. M. 6536.)

N. versicolor (various-coloured). A synonym of *N. stellata versicolor.*

NYMPHÆACEÆ. A small order of freshwater herbs, widely dispersed over the globe. Flowers mostly floating, showy, often on scapes which rise to some distance above the water; sepals three to six, petals three to many, and stamens six to many. Fruit sometimes emerging, sometimes maturing under water. Leaves rarely emerging from the water, often peltate, involute in vernation, the submerged ones not unfrequently dissected.

Nymphæaceæ—*continued.*

The order comprises eight genera and about thirty-five species. Examples: *Cabomba, Nelumbium, Nymphæa, Victoria.*

NYSSA (from *Nyssa*, a water-nymph; in allusion to the habitat of some of the species). Tupelo-tree. ORD. *Cornaceæ.* A small genus (five or six species) of mostly hardy trees or shrubs, inhabiting the North-eastern, temperate, and warmer parts of America, also the Eastern Himalayas, the Khasia Mountains, and the Malayan Islands. Flowers small, at the apices of the axillary peduncles, in crowded heads or shortly racemose. Drupe oblong. Leaves alternate, petiolate, entire, or the younger ones dentate-lobed. The species are not much grown in this country; their chief attraction is the intense deep scarlet colour which the leaves assume in the autumn. Nyssas thrive best in low, damp, moist situations, such as peat swamps. Propagated by imported seeds, and by layers.

N. capitata (capitate). Ogechee Lime. *fl.*, sterile ones capitate; fertile ones solitary, on very short peduncles. *fr.* an oblong drupe, red. *l.* large, shortly-stalked, oblong, oval, or obovate, mucronate or acute, tomentose beneath. Swamps of South United States. Small tree.

N. multiflora (many-flowered). *fl.* greenish; fertile peduncles 1½in. to 3in. long, slender, three to eight-flowered. May. *fr.* dark blue, ½in. long. *l.* rather thick, dark green, oval or obovate, mostly acute, tomentose when young, at length shining above, 2in. to 5in. long, turning bright crimson in autumn. *h.* 30ft. to 50ft. North America, 1824. SYN. *N. villosa.*

N. villosa (villous). A synonym of *N. multiflora.*

NYSSACEÆ. Synonymous with *Cornaceæ.*

OAK. Oak is the name indiscriminately given to any member of the large genus *Quercus*, which contains about 300 species, principally distributed over the temperate regions of the Northern hemisphere. Within the tropics, in America, Oaks occur on the mountains as far South as Columbia, and, in Asia, to the Malayan Archipelago. The genus is entirely absent from Africa (except the Mediterranean region), Madagascar, Australia, the South Sea Islands, &c.; and, so far, no Oaks have been found in New Guinea. Whether looked at from the standpoint of number of species, or from the value of a large number of them from a purely commercial point of view, the genus *Quercus* is by far the most important one in the family *Cupuliferæ.* As a forest-tree—at any rate, in the British Isles—the common Oak is that which undoubtedly occupies the first place. For landscape effects, too, on a large scale, the massive, rugged stems and twisted branches furnish an element of picturesqueness which is unique in character. Several of the exotic species, however, far surpass our native one in the brilliancy of the colours assumed by the decaying leaves in autumn, as well as in the rate of growth; many of the evergreen and sub-evergreen ones, too, are amongst the most beautiful of hardy trees. The British Oak (*Quercus Robur*) is found both in Europe and Asia, almost up to the Arctic circle. As might naturally be expected with such an extended geographical distribution, there are very many forms, some of which differ markedly from any found in this country. Of these latter, the two principal are *pedunculata*, with sessile leaves and long peduncles, and *sessiliflora*, with stalked leaves and very short peduncles. For convenience of reference, these forms are accorded specific rank under *Quercus*, and the principal garden forms are described under each.

The great age attained by the Oak is proverbial; the age of some of the famous old trees—the Cowthorpe Oak, for example—has been estimated at 1800 years. That just mentioned is, or was, the largest Oak in England. In the "Gardeners' Chronicle," n. s., vol. xvi., p. 134, the following particulars are given respecting this tree. It may, however, be better to state that the Oak in question is growing near Wetherby, in Yorkshire, but that its ruins

Oak—*continued.*

only now remain. The circumference at 3ft. from the ground, in 1776, was 48ft. The height of the tree as a ruin was 85ft.; in 1880, the writer of the article on "Tree Lore," from which the above data are gleaned, noticed that the old tree still had a few green leaves. The following quotation was given in a Nottingham paper, two years ago, in reply to inquiries respecting "the present condition of the trees of Sherwood Forest." The information is contained in an article by Mr. W. Senior, in Cassell's "Picturesque Europe," on "The Forest Scenery of Great Britain," in which that writer states, that at Welbeck there is the Greendale Oak, which is estimated by one authority to be 700, and by another 1500, years old. "This Oak is probably the Methusaleh of his race, although it may be noted that there are few forests which do not, through their local historians, advance plausible claims for a like distinction. The Greendale Oak, nearly 150 years ago, was deprived of its heart by the eccentric desire of a former owner to make a tunnel through the trunk. This novel piece of engineering was effected without any apparent injury to the tree; an opening was made, through which a Duke of Portland drove a carriage and six horses, and three horsemen could ride abreast. This arch is 10ft. 3in. high, and 6ft. 3in. wide. A cabinet, made from the excavated Oak wood, for the Countess of Oxford, is one of the curiosities of Welbeck Abbey (the seat of the Duke of Portland). It is ornamented with a representation of this grand old tree, which is now shored and supported against the elements, before which it must, ere long, succumb. The Spread Oak of Thoresby extends its arms over 180ft. of ground, and can give shelter to 1000 horsemen. In the hollow of Major Oak, seven persons have dined with comfort; and that, of course, is impossible without unrestricted elbow-room. This tree is remarkably perfect in form, the true type of a sturdy Oak that is still prepared to brave the battle and the breeze."

It would be out of place here to dilate upon the value of English Oak; but the following data respecting its durability may be of interest. In the Museum No. 1 at Kew is a block of Bog Oak, a portion of a tree found below the Roman (Hadrian's) Wall, in cutting the canal from Carlisle to the Solway Firth, in 1823. According to Bruce's "Roman Wall," a quantity of posts and rails were made of the trunks, and used for fences. There is also a portion of a pile of old London Bridge—apparently as sound as it was the day it was first worked—taken up in 1827, after having been in use about 650 years. Amongst other interesting specimens is a part of an Oak beam from the Council Chamber in the White Tower, Tower of London; this is supposed to be coeval with the building of the Tower of London by William Rufus, and the adze-marks of the woodmen or builders of that period are distinctly visible.

Cork is obtained from the thick bark of *Quercus Suber*, a common South European Oak. Kermes is the insect which yields a scarlet dye nearly equal to cochineal, and is the "scarlet" mentioned in Scripture; it feeds on *Q. coccifera*, an Oak from Asia Minor, &c. The acorn cups of *Q. Ægilops* are largely imported from the Levant for the purposes of tanning, dyeing, and making ink. The Oak Galls of commerce are yielded by *Quercus infectoria*, also a native of the Levant; these are much more rich in tannin than those produced in this country. *See also* **Quercus.**

Insect Pests. The number of these is legion. In Kaltenbach's "Pflanzenfeinde," there are 537 species of German insects recorded as living, more or less, on Oaks, and the number might be largely increased were the compilation continued up to the present date. Many of them, it is true, live habitually upon other trees, and on shrubs, only occasionally attacking Oaks, and

Oak—*continued.*

seldom doing very great harm to the latter; yet even they may at times do great damage to Oaks, such as the larvæ of various moths (*see* **Hybernia, Lackey Moth, Liparis, Orgyia antiqua,** &c.) to the leaves; Cockchafer grubs, Mole Crickets, &c., to the roots; *Balaninus nucum*, or Nut-Weevil, in the fruit, &c. It may, indeed, be said that no part of the tree is safe from the attacks of insect foes; but it is impossible here to do more than mention a few of the more interesting and important of these. Several beetles (*see* **Tomicidæ**), *e.g.*, *Platypus cylindrus*, *Xyleborus dryographus*, &c., and some moths (*see* **Goat Moth**) bore into the wood, and render it unfit for use; but, fortunately, they seldom attack healthy trees. As a precaution against them, all the dead trunks should be removed, and dead branches should be destroyed. The other moths above mentioned are hurtful by consuming the leaves of Oaks, Beech, and many other trees. But even more thorough in the extent of its ravages is a small moth (*Tortrix viridana*), which almost restricts itself to the common Oak. It reaches about ¾in. in the spread of the front wings, which are green. The larvæ live for a time in the buds, then in the leaves, and pupate in leaves spun together, or in the soil. In some seasons, and in certain localities, hardly a leaf is allowed to remain on the trees. Shaking the branches over sheets laid on the ground will cause the larvæ of all the moths to fall on to the latter, from which they may be swept up and destroyed. The same method may be employed for the capture of various kinds of small beetles, chiefly Weevils, that gnaw the leaves and buds, as well as of Cockchafers, which, at times, do considerable damage to the trees.

The leaves are frequently mined by the larvæ of small moths and beetles, but the injury from this cause is too slight to call for discussion at present; and, for the same reason, the larvæ that feed in the buds may be passed over in silence. Among the more frequent causes of injury to the acorns is the beetle *Balaninus nucum* (*see* **Nut-Weevil**). Numerous species of Green Fly attack the Oak, and, at times, must weaken the trees very greatly, covering the lower leaves with honeydew, among which grows the Fungus *Capnodium quercinum* (*see* **Oak Fungi**), which may, in some cases, prove hurtful to the trees. But, of all the insects that attack Oaks, probably the most striking, in respect to the effects produced by them, are the makers of the various Galls so frequent and so noticeable on Oak trees. *See* **Oak Galls.**

OAK APPLE. *See* **Galls** and **Oak Galls.**

OAKESIA (of Tuckerman). A synonym of *Corema*.

OAKESIA (of Watson). Included under **Uvularia** (which *see*).

OAK FERN. *See* **Polypodium Dryopteris.**

OAK FUNGI. The species of Fungi that live upon the common Oak are numerous; but by far the larger proportion either do comparatively little injury, or make their appearance only on dead parts of the trees; *e.g.*, on bark or wood of dead branches, or on leaves or acorns. Many of the species are very minute, but only a few of the more injurious will be mentioned here. Those of chief importance belong to the *Hymenomycetes* (*see* **Mushrooms**), and, for the most part, to the genus *Polyporus*, which has pores instead of gills on the lower surface of the cap, or spore-producing structure. The following are among the more noteworthy species, inasmuch as their mycelium traverses the living wood of the Oak, and withdraws the nourishment from the cells of the wood, which, in consequence, becomes decayed and brittle. The cap, in most of the species, grows to a breadth of several inches. Of *Polyporus*,

Oak Fungi—*continued.*

several species attack living wood of Oak, *e.g.*, *P. dryadeus*, *P. sulphureus*, *P. igniarius*, and *P. intybaceus*; so also does the nearly-allied *Fistulina hepatica*, or Beefsteak Fungus. In each case, the mycelium of the Fungus usually gains entrance by the uncovered end of a branch, or a wound, and spreads through the wood cells. Careful pruning, and protection of wounds by tar, or some other dressing, are of very great service in preventing the entrance of mycelium, and the consequent development of the Fungus, with its disastrous results to the trees. The methods of pruning, and of protecting wounds, cannot be treated of under this head, but will be found fully described in this work under the appropriate headings. Trees suffer much injury from Fungi in their roots, which become attacked by the mycelium spreading in the soil from adjoining roots of dead trees; hence, care should be taken to remove, as far as possible, all decaying wood from soil in the neighbourhood of healthy trees, lest the Fungi should extend to the roots of the latter, and, after a time, cause their destruction. Trees, when badly attacked by these Fungi, should be cut down and destroyed, to prevent the spread of the Fungi to healthy trees. *See* **Polyporus.**

A soot-like crust very frequently covers the leaves of Oaks, as well as of many other trees and shrubs. When examined microscopically, it is seen to be formed of cells and threads of a Fungus, belonging to a group included under the name *Fumago*, called also, when fully developed, *Capnodium*. In *Capnodium*, the spores for reproduction are produced in the interior of larger cells (asci), many of which are inclosed in a globular or flask-shaped vessel (perithecium), of microscopic size; but this stage of development is not often met with. The *Fumago* stage is much the more common. In this, the reproductive cells are separated from the tips of threads on the exposed surface, or are produced in minute flask-like perithecia, but not in asci. The crusts are much like soot in general appearance, like it, resting only on the upper surface of the leaves. They have frequently been attributed to injury from smoke, leading more than once to lawsuits for compensation for such alleged injury. The microscope shows the cell walls to be dark brown.

The Fungus is readily removable from the leaves by rubbing the surface. It does not seem to derive nourishment from them—at least, to any marked extent—but feeds in large degree, probably, on the honeydew excreted abundantly by various kinds of Aphides, or Green Flies. As these insects live on the lower surface of the leaves, their excretions fall on the upper surface of leaves below them, which explains the presence of the Fungus on that surface. If present only in small amount, the crust does not seem to do much injury to the trees; but when thick, it partially chokes the leaves, and cuts off the light from them, so that they become sickly, and fail to nourish the trees. This seldom occurs before autumn, which is fortunate, as there is hardly any practicable method of removing Fungi from trees such as Oaks. The species found on Oak has received various names, that generally adopted being *Capnodium quercinum*.

OAK GALLS. Very noticeable, because of their size, the peculiarities of their forms and colours, and the distortions and alterations that they occasionally produce on various parts of Oaks, are the Galls, so frequently seen by even the least observant spectator who passes an Oak-tree in autumn. The development of the Galls, and of their makers, is now believed to be very peculiar in certain respects in the case of most of them; but only a few of them are here selected as examples. Galls are new structures budded out from stems, leaves, or other parts of plants, under the influence of a stimulus applied

Oak Galls—*continued.*

either by lower plants (Fungi), or by animals, which produce the Galls either for the protection of their young and immature larvæ, or for their own protection at all stages of development. The makers of Oak Galls belong almost entirely to the great group of *Hymenoptera*, known as *Cynipidæ*, or True Gall Flies, almost the only exceptions being a few Midges, which merely fold down the lobes of leaves, making them become fleshy.

The *Cynipidæ* are all of small size, seldom exceeding ¼in. in length, with a rather greater spread of wing. They vary a good deal in colour—from reddish-brown to black—and frequently show metallic reflections. The wings are supported by a few nerves. The females possess, at the end of the abdomen, an ovipositor, and, by means of this organ, which is frequently of considerable length, they bore into some parts of the tree, and thereby give rise to the "Gall."

Galls are found growing from every part of Oak-trees, from roots and branches, to leaves, stamens, and ovaries, or fruits; and, in harmony with such diversity of situation, they vary exceedingly in their appearance, consistency, and internal structure; but all those of the *Cynipidæ*, or Gall Flies, in the strict sense, to which almost all the Gall-makers in the Oak belong, agree in this, that there is a central space, with walls in which the cells immediately around the space usually contain starch; while outside this layer there is generally another, for defence, formed of thick-walled, compact cells. In the central cavity lies the single, footless, pale grub of the Gall Fly; or, if the intruders have destroyed the host larva, two or more larvæ of the parasites may be found in each Gall, generally inclosed in separate chambers. In many of the rounded Galls there is also a considerable layer of beautifully arranged cells (spongy tissue) in the walls. Galls on the roots require to be specially sought for, because of their being concealed under the soil.

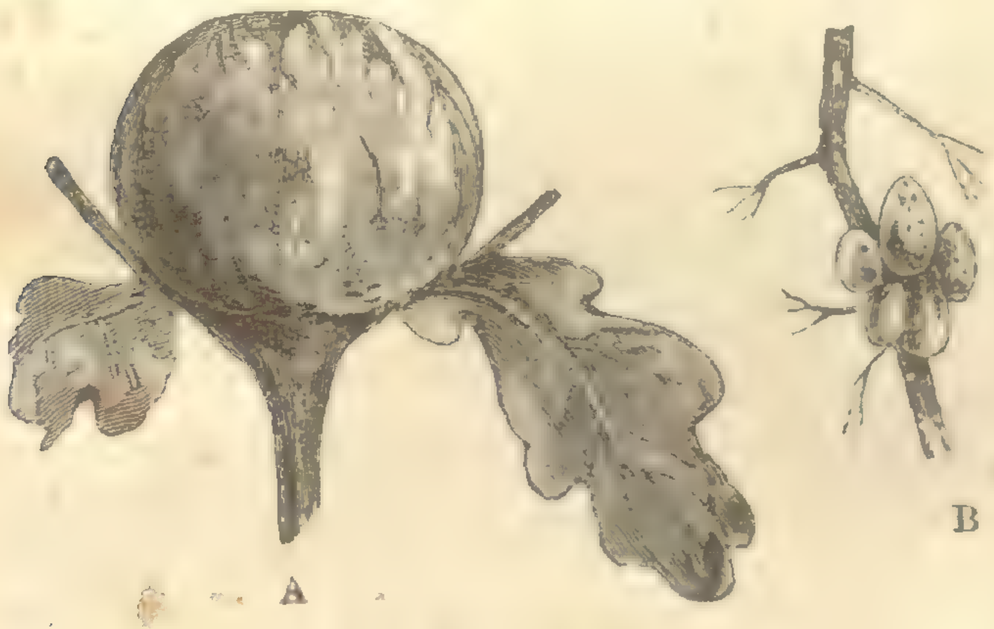

FIG. 705. OAK GALLS.

A, Gall of *Dryoteras terminalis* (Oak Apple), about two-thirds natural size.

B, Young Root of Oak, bearing Galls of *Biorhiza aptera*, about two-thirds natural size. These Galls vary much in size, and are often crowded into a mass, and fused together. When fresh, they are red, and rather fleshy; but, in drying, they become dark brown and hard. They are believed to be the autumn form of the cycle to which "Oak Apples" belong as the summer form. The insects that emerge from them are all wingless females.

The Gall of *Biorhiza aptera* (see Fig. 705) is one of the commonest. The others do not call for further notice here. Galls on the main stems are not very numerous. Far more conspicuous and important are those formed on the branches. Many of these are modified buds; numerous others are conspicuous Galls formed upon the leaves, usually on their lower surface; and still others are stamens or ovaries, changed in structure by the

Oak Galls—*continued.*

punctures of the parent insects. On the Continent of Europe, nearly 100 different forms of Galls have been found on Oaks; and in Britain, the number of forms already observed reaches nearly forty. Among the more widely-known Galls may be mentioned the Oak Apple (see Fig. 705), found, in May and June, on the twigs, as an oblong mass, from 1in. to 2in. long, covered with a smooth, green and red skin, above a layer of soft tissue, in which are imbedded numerous larvæ, each one in a hard-walled cell or chamber in the centre of the Gall. The Cotton Gall resembles a ball of white cotton wadding surrounding a number of minute thin-walled chambers, each occupied by one larva of small size. The whole mass may reach a size of 1in. or more across, and is very conspicuous, as it hangs attached to the male catkins in May and June. The Devonshire, or Marble, Gall of the Oak is very easy to recognise, as it is about the size and form of a boy's marble, green and soft when young, but brown and hard when mature. Two or more of the Galls often join together during growth, and form irregular masses. In the centre is a small cavity, inhabited by the larva. It is said that this Gall was introduced from the Continent, and was first observed in Devonshire; but, whatever its origin, it is now abundant in many parts of Britain. Experiments have not succeeded in rearing males, but have yielded many female Gall insects from these Galls, and, along with them, seventy or more kinds of insects that live in the Galls, either as guests (inquilines) or as true parasites. The name of the Gall-maker is *Cynips Kollari*. The Artichoke Gall, formed by *Aphilothrix gemmæ*, very much resembles a miniature Artichoke, about 1in. long, formed of scales, with a central chamber like a small acorn. Various kinds of bud Galls are too small to be found without careful search, and are of interest chiefly because of the relation of some of them to other conspicuous forms that disfigure young Oak-trees in pleasure grounds.

The leaves bear many curious forms of Galls, some of them so conspicuous that they cannot have escaped the notice of even the least observant. One that causes

FIG. 706. OAK GALLS.

A, 1, Cluster of Galls of *Andricus curvator* in Oak Leaves, about natural size; 2, Gall in Transverse Section, showing small inner Gall.

B, Oak Twig, with two Galls of *Aphilothrix collaris*, natural size.

much damage is the work of *Andricus curvator* (see Fig. 706). It is produced on the midrib, or leafstalk, and causes a marked bend, or twist, in the leaf, or at its base in the branch; the Gall forms a green swelling, about the size of a pea. Inside this lies a small, brown, kidney-shaped inner Gall, which, when ripe, is quite free from the inside of the wall of the large chamber. The Currant Galls, resembling translucent currants, pale, with purple or red mottlings,

Oak Galls—*continued.*

and very juicy, are common, in May and June, on the lower surfaces of leaves, and on catkins, where they

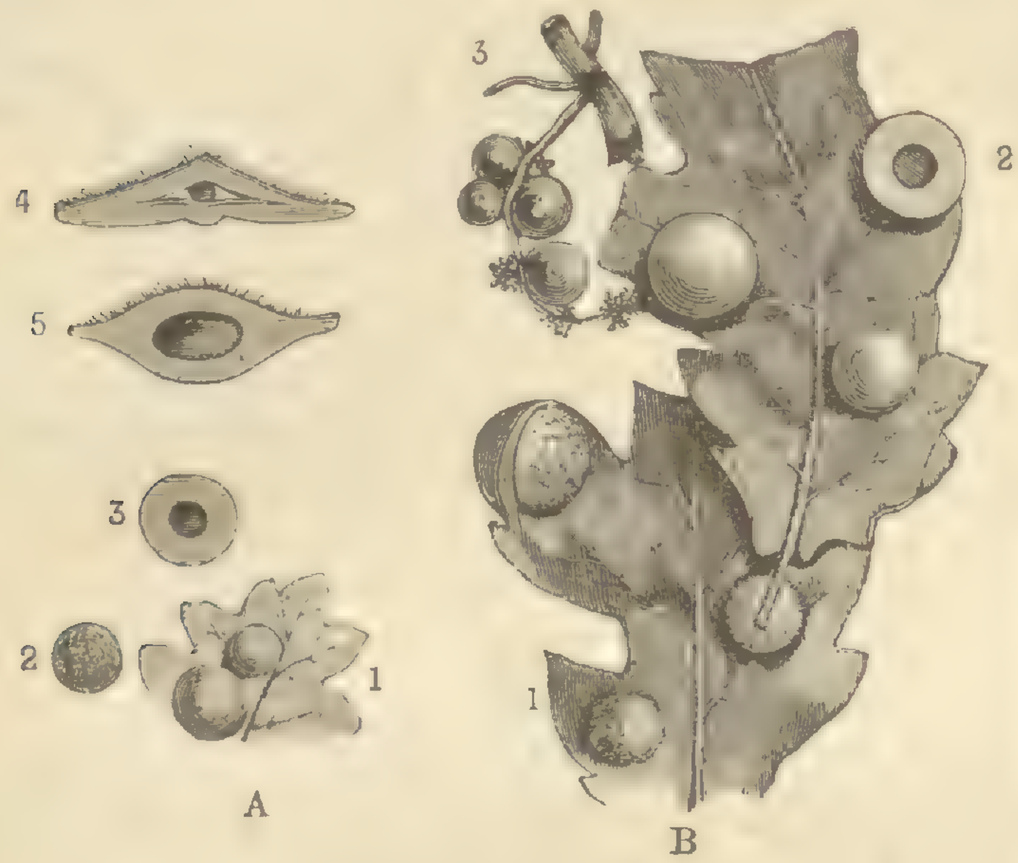

FIG. 707. OAK GALLS.

A, Galls of *Neuroterus lenticularis* (Oak Spangle Galls)—1, On Lower Surface of Leaf; 2, Removed from Leaf; 3, Flat Section, showing round Chamber in centre where the Larva lives; 4, Transverse Section, in autumn, showing Form while still on the Leaf, with very small Chamber; 5, Transverse Section of Gall in following spring, showing changed Form and much larger Chamber. (Nos. 4 and 5 are about four times enlarged.)

B, Galls of *Spathegaster baccarum* (Currant Galls of Oak)—1, Upper Surface of Leaf, showing Galls projecting through; 2, Lower Surface of Leaf, showing three Galls, of which the Upper is cut through to show the Larval Chamber; 3, Male Catkin bearing Galls. (All the figures are a little smaller than natural size.)

look like bunches of Currants (see Fig. 707). The insects (*Spathegaster baccarum*) are easily reared from these Galls,

FIG. 708. OAK GALLS.

A, 1, Galls of *Dryophanta folii* on Lower Surface of Oak Leaf, slightly smaller than natural size; 2, Transverse Section, showing Larval Chamber.

B, 1, Galls of *Spathegaster Taschenbergi* on a Young Twig, natural size: 2, Gall enlarged. These Galls are violet, with a velvety surface, are soft, and are eaten by the larva till the wall becomes very thin. They appear in May and June; and, though not recorded from Britain, are believed to be the Galls that complete the cycle with those of *Dryophanta folii*.

if the latter are collected when fully mature, and prevented from becoming either too dry or mouldy. *Dryo-*

Oak Galls—*continued.*

phanta folii produces a globular Gall on the backs of leaves. It may reach ¾in. in diameter, but the central chamber is small, the walls being thick, though soft and spongy. The surface becomes yellow and red. See Fig. 708. *Dryophanta divisa* also forms Galls on the lower surface of leaves, but the Galls are generally flattened, oval bodies, much smaller than the last-named, with harder, but thinner, walls. They are also more abundant throughout the country. Oak Spangles are among the most curious of Oak Galls. They occur on leaves, almost always on the lower surface. Three kinds have been distinguished in Britain, agreeing in being circular, about ½in. across, and, while on the leaf, quite thin, though bearing a very slight prominence in the middle. The commonest is covered with rusty brown hairs; it often nearly covers leaves. See Fig. 707. Of the other two, one bears similar scattered hairs, and has the margin turned up; while the third is green or purple-red, and smooth. All are the work of insects belonging to the group *Neuroterus*, and which are named *N. lenticularis*, *N. læviusculus*, and *N. fumipennis*. Another species of this genus (*N. numismatis*) makes Silky Button Galls, so called from their resemblance to tiny, round, flattened

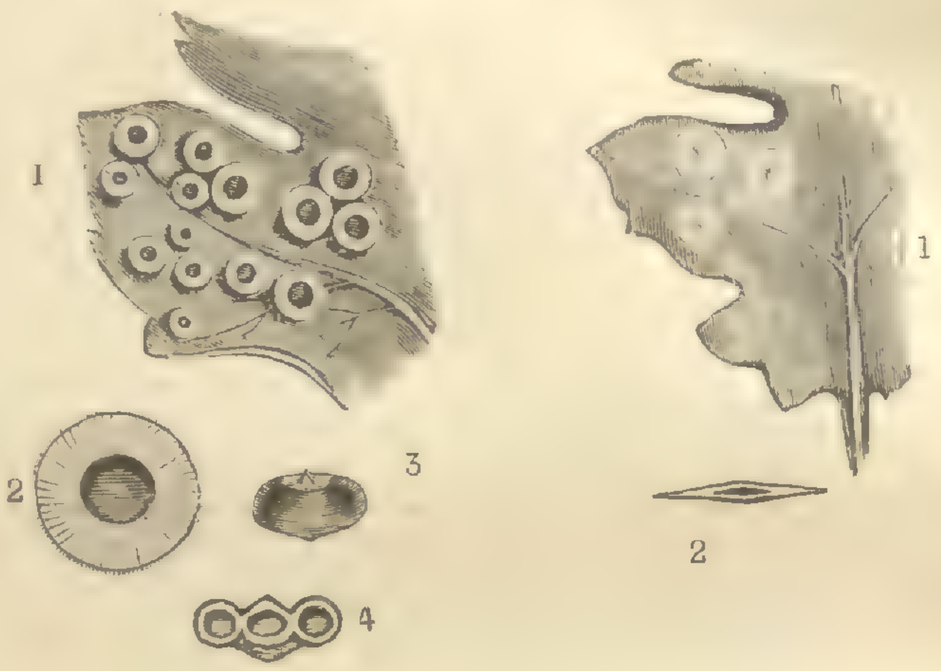

FIG. 709. OAK GALLS.

A, Galls of *Neuroterus numismatis* (Silky Button Galls of Oak)—1, Lower Surface of Leaf, bearing many, about natural size; 2, Gall showing the depressed Surface, enlarged; 3, Gall seen from the side; 4, Gall in Section, showing small central Chamber for Larva, hollow Border cut through at each side, and short Footstalk.

B, 1, Three Galls of *Spathegaster vesicatrix* (Blister Galls of Oak Leaves) in a Leaf, natural size; 2, Transverse Section of Leaf, with Gall, showing very small Larval Chamber.

buttons, covered with brown silk threads (see Fig. 709). These Galls are often formed in myriads on the lower surface of the leaves, so as, in some cases, to cover it almost entirely in autumn. Yet another Gall, of very frequent occurrence, is so inconspicuous as to be easily overlooked in the leaves, in which, during June, it looks like a mere low blister, about ⅛in. across (see Fig. 709). The insects reared from these Galls have been named *Spathegaster vesicatrix*. This may be called the Oak Blister Gall.

In acorns, at times, Galls are to be found in the seed, though the outside of the acorn shows no sign of insect work. The interior is broken up by numerous small oval spaces, in each of which lives a small larva of the Gall-maker (*Andricus glandium*).

These brief notes must suffice for the more common forms of Oak Galls; and attention must now be directed for a little to certain points in the life of the Gall-makers—points which, for a considerable time, seemed to defy explanation, but which are gradually emerging into the light, thanks to the careful experiments and observations of

Oak Galls—*continued.*

entomologists, pre-eminent among whom stands Dr. Adler. The following are two very noteworthy peculiarities connected with many Oak Galls: (1) From certain kinds, *e.g.*, Devonshire Gall, Oak Spangles, &c., females alone have been reared (sometimes in thousands), while from others males as well as females are readily obtained in confinement. Where females alone emerge from Galls, they lay eggs that produce larvæ, though unimpregnated. But we can hardly imagine that this mode of reproduction can go on perpetually without requiring to be re-invigorated by the influence of males. (2) Certain kinds of Galls appear only in early summer; *e.g.*, Currant Gall, Blister Gall, and Oak Apple. The insects emerge from the Galls in June or July, and may be observed to lay their eggs at once on the twigs, buds, or leaves; yet no trace of the Galls can be seen before the succeeding spring. In like manner, many Galls are met with only in autumn, *e.g.*, Oak Spangles, Silky Button Galls, &c., and the insects emerge from them in spring, lay eggs on the Oaks, and disappear; but the Galls re-appear only in autumn.

The insects reared from each form of Oak Gall are distinguishable, by an expert, from those reared from every other form, the differences affecting form and size of the ovipositor, wings, and other important organs, as well as such minor points as colour. Formerly, it was very difficult to understand alike the constancy with which only females emerged from some Galls, and the (supposed) length of time between the puncture of the plant by the parent Gall Fly, and its result in the formation of a Gall, some months later. The explanation of both difficulties now seems afforded to us in the discovery, first announced from the United States by Mr. Walsh, in 1870, but chiefly wrought out and enforced in its application to the life-history of Gall Flies (*Cynipidæ*) by Dr. Adler. This explanation is, that most of these insects appear in two annual broods; that these broods differ from one another in the Galls formed by them, as well as in the structural characters of the mature insects; in short, that the insects and their Galls alike are dimorphic—a unisexual brood appearing in winter or spring, laying eggs, though unimpregnated, and producing Galls in early summer, from which emerge, in a month or two, insects differing so much from their parents (makers of the Galls) that they have been referred to genera different from the latter. The later brood possess males as well as females: these pair, and the females produce Galls similar to those with which the cycle was begun. Such a cycle has now been traced in many of our native Gall Flies. Subjoined are noted only five such cycles, all figured above, since even to enumerate all the cases would exceed the space available here. The two forms of Galls are, in each case, placed in the same line, the spring or early summer form to the left, the autumn form to the right. They are as follows:

Andricus curvator.	*Aphilothrix collaris.*
Dryoteras terminalis.	*Biorhiza aptera.*
Spathegaster baccarum.	*Neuroterus lenticularis.*
Spathegaster Taschenbergi.	*Dryophanta folii.*
Spathegaster vesicatrix.	*Neuroterus numismatis.*

It is at once evident that, if this theory of the existence of dimorphism among Oak Gall Flies be true, it sufficiently explains the problems, stated above, in regard to unisexual insects alone being reared frequently, and to the supposed interval between the puncture and the formation of the Gall.

Remedies. It is seldom necessary to take active means to reduce the numbers of Oak Galls, although, at times, the lower surface of the leaves—almost every square line upon it—bears one or more Galls, such as Oak Spangles and others of the smaller kinds. Their presence does not seem to weaken the trees very materially—a fortunate circumstance, since remedies could scarcely be applied with success to huge trees, or even to Oak-bushes. Almost the only Gall deserving to be mentioned as distorting twigs and leaves, is the work of *Andricus curvator.* The supposed second stage of this Gall is a tiny egg-shaped excrescence, half hidden among the leaf scales in buds; the insect reared from it has been named *Aphilothrix collaris.* Where so many occur as to injure the plants, the best remedies are to hand-pick and to destroy the Galls. Another Gall that occasionally distorts the branches of Oaks, though much less often than the last-mentioned kind, is that of *Andricus inflator:* it is a swelling at the tips of the young twigs. In the centre is a cup-shaped hollow, closed above by a thin membrane; and at the bottom of the hollow is a small, ovate, brown, very thin inner Gall. The insects emerge in July, and there are both males and females amongst them. The Gall believed to alternate with this is globular, scarcely over ⅛in. across, green, and smooth; and is formed in the buds in autumn, remaining concealed in the bud scales. The insects emerge in early spring, are all females, and have been named *Aphilothrix globuli.*

OAT, or **OATS.** *See* **Avena.**

OB. This term, used in the composition of Latin technical terms, signifies inversion; *e.g.*, *obovate* means inversely ovate; *oblanceolate*, inversely lanceolate, &c.

OBCOMPRESSED. Compressed, so that the two sutures of a fruit are brought into contact; flattened, back and front.

OBCONICAL. Inversely conical.

FIG. 710. OBCORDATE AND RETUSE LEAF.

OBCORDATE. Inversely cordate. An Obcordate and retuse leaf is shown at Fig. 710.

OBELISCARIA. Included under **Rudbeckia** (which *see*).

OBERONIA (so called after Oberon, the Fairy King, in allusion to the quaint and variable forms of the plant). ORD. *Orchideæ.* A genus comprising about fifty species of stove, epiphytal, tufted orchids, natives of tropical Asia, Australia, and the Mascarene and Pacific Islands. Flowers small, in numerous dense, sub-cylindrical racemes, or spikes, sessile, or shortly pedicellate; sepals free, sub-equal; petals narrower, or shorter, than the sepals; lip sessile, usually concave. Leaves distichous; sheath compressed, equitant. The species are of botanical more than horticultural interest. Those described below will grow attached to blocks of wood, suspended near the glass, in a warm, moist house. Care must be taken to guard against superfluous moisture, both at the root and in the air, especially during winter. Propagation is effected by dividing the tufts.

O. acaulis (stemless-leaved). *fl.* orange, numerous, on a long, cylindrical raceme; sepals and petals uniform, ovate, singularly reflexed; lip sub-quadrangular, three-lobed, the middle lobe bi-lobed; column very short. Spring. *l.* stemless, few, the longest 1ft. long, ensiform, falcately recurved, long-acuminate. Eastern Bengal. (B. M. 5056.)

O. iridifolia (Iris-leaved). A synonym of *O. tahitensis.*

O. tahitensis (Otaheite). *fl.* yellow, very numerous, verticillate; sepals reflexed, ovate, equal; petals reflexed, erose; lip erect, with a fimbriated, involute margin. June. *l.* ensiform, similar to those of an Iris, drooping or pendulous, sometimes longer, sometimes shorter, than the raceme. Pacific Islands, 1840. (B. M. 4517, under the name of *O. iridifolia.*)

OBESIA. A synonym of **Podanthes** (which *see*).

OBLIONKER-TREE. A common name of *Æsculus Hippocastanum*.

OBLIQUE. Unequal-sided, or slanting.

OBLONG. Elliptical, and obtuse at either end; *e.g.*, the leaf of some species of *Rumex*, *Sedum*, &c.

FIG. 711. OBOVATE LEAF.

OBOVATE, or **OBOVOID.** Inversely egg-shaped, with the broadest end uppermost. An Obovate leaf is shown at Fig. 711.

OBSOLETE. Hardly evident.

OBTUSE. Blunt, or rounded.

OBVERSE. A term applied in precisely the same manner as **Ob** (which *see*).

OBVOLUTE. Having one part rolled upon another.

OCELLATED. When a broad round spot of one colour has a different-coloured spot within it.

OCHNA (from *Ochne*, the old Greek name, used by Homer, for the Wild Pear, to which the foliage of this genus bears some resemblance). ORD. *Ochnaceæ*. A genus comprising about twenty-five species of stove, evergreen shrubs, natives of tropical Asia and tropical and Southern Africa. Flowers yellow, racemose, rising from below the leaves, from the wood of the preceding year; sepals five, coloured; petals five to ten; pedicels articulated. Fruit succulent, of five, ten, or fewer carpels, placed on the enlarged receptacle. Leaves alternate, deciduous, serrulate, rarely entire, coriaceous, shining, thickly nerved. Several species are very ornamental, but the undermentioned are probably the only ones in cultivation. They thrive best in a compost of sandy peat and fibry loam; plenty of drainage is very essential. Propagated, during summer, by cuttings of half-ripened shoots.

O. atropurpurea (dark purple). *fl.*, petals yellow; calyx dark purple, with ovate lobes; pedicels solitary, one-flowered. *l.* ovate, acutely denticulate. *h.* 4ft. Cape of Good Hope, 1816. (B. M. 4519.)

O. multiflora (many-flowered). *fl.* yellow, of very short duration. Spring. *fr.*, receptacle gradually increasing in size, becoming globular in form, about the size of a Strawberry, but less conical, and similar in colour; upon it are placed the black, seed-like bodies, about the size of Peas, which are really the carpels, and these present a striking contrast with the bright crimson receptacle and calyx. *l.* narrow, elliptical, bright green, serrated. *h.* 4ft. to 5ft. Sierra Leone, 1820 and 1882. A remarkable and handsome plant.

OCHNACEÆ. An order of trees or shrubs with watery juice, sparsely scattered over the whole of the tropical regions (mostly in America). Flowers hermaphrodite, often large and showy, usually paniculate, rarely axillary and solitary, or fasciculate; sepals four or five, free, imbricated; petals five, rarely four or ten, free, longer than the calyx, deciduous, spreading, subsessile, imbricated or convolute. Fruit a drupe or berry. Leaves alternate, stipulate, highly glabrous, simple (in one genus pinnate), coriaceous, frequently with serrated margins, often thickly nerved; stipules varying. Some of the species possess tonic properties. The berries of *Gomphia Jabotapita* are edible. The order contains a dozen genera and about 140 species. The principal genus is *Gomphia*.

OCHRACEOUS, or **OCHREOUS.** Having the colour of yellow ochre.

OCHRANTHE. A synonym of **Turpinia** (which *see*).

OCHREA. A term applied to a membranous tubular stipule, formed by the consolidation of two opposite stipules, and through which the stem passes.

OCHROCARPUS (from *ochros*, yellow, and *karpos*, a fruit; alluding to the colour of the fruits), SYN. *Calysaccion*. ORD. *Guttiferæ*. A genus comprising about half-a-dozen species of stove trees, natives of Asia, tropical Africa, and the Mascarene Islands. Flowers polygamous, disposed in lateral or axillary short cymes or fascicles; petals four. Leaves opposite or ternately whorled, coriaceous. The species described below is probably the only one yet introduced; it thrives freely in a sandy loam compost. Propagation may be effected by cuttings of the ripened wood, inserted, with the leaves intact, in sand, under a glass, in moist heat.

O. africanus (African). *fr.* with a brown and thick rind, and a yellow pulp, twice the size of a man's fist, round. *l.* oblong, acuminated, shining dark green, abounding in a yellow, resinous gum. *h.* 60ft. Tropical Africa. SYN. *Mammea africana*.

OCHROLEUCUS. Whitish-yellow.

OCHROMA (from *ochros*, pale; referring to the colour of the flowers). ORD. *Malvaceæ*. A monotypic genus. The species is a stove evergreen tree. It thrives in a rich sandy loam. Propagated by cuttings of half-ripened side-shoots, inserted in sand, under a bell glass, in heat.

O. Lagopus (hare's foot). *fl.* pale brown or yellowish, large, erect; peduncles solitary, terminal, one-flowered. Capsule more than 1ft. long. *l.* cordate, five to seven-angled, rather lobed, toothleted, downy beneath. *h.* 40ft. West Indies, &c., 1802.

OCHROPTERIS (from *ochros*, pale, and *pteris*, a fern; in reference to the colour of the plant). ORD. *Filices*. A monotypic genus. The species is an extremely rare and beautiful stove fern, requiring an abundance of heat and moisture to grow it successfully. It thrives best in a compost of peat and sand, with a little loam added. For general culture, *see* **Ferns.**

O. pallens (pale). *sti.* 2ft. long, naked. *fronds* about the same length, about 1ft. broad, deltoid, quadripinnatifid; lower pinnules 3in. to 4in. long, 2in. broad, their segments cut down to the rachis below, with oblong, toothed, lower lobes. *sori* marginal, transversely oblong, occupying the apices of the lobes of the segments; involucre the same shape as the sorus, formed of the reflexed margin of the frond, with which it coincides in texture, and covering the sorus. Mauritius. (H. S. F. 77B.)

OCHROSIA (from *ochros*, pale yellow; alluding to the colour of the flowers). SYNS. *Bleekeria*, *Lactaria*. ORD. *Apocynaceæ*. A genus comprising about a dozen species of stove trees, allied to *Cerbera*, natives of the Mascarene Islands, tropical Australia, the Malayan Archipelago, and the Pacific Islands. Calyx five-parted; corolla funnel-shaped, five-lobed; cymes pedunculate, at the tips of the branches. Leaves whorled or rarely opposite or scattered, slender, and thickly penniveined. The two species here given are probably the only ones yet introduced. For culture, *see* **Tabernæmontana**.

O. borbonica (Bourbon). *fl.* white, rather large; calyx lobes ovate. June. *l.* three (rarely four) in a whorl, oblong or oblong-lanceolate, obtuse or sub-acute, 3in. to 6in. long, glossy, ¾in. to 1¼in. broad, often spotted; margins not revolute. *h.* 20ft. to 40ft. Mauritius, &c., 1782. SYN. *O. maculata*. (A. B. R. 130, under name of *Cerbera undulata*.)

O. elliptica (elliptic-leaved). *fl.* yellow, in small, dense, corymbose cymes, shortly pedunculate in the uppermost axils, *l.* elliptic, coriaceous, deep green, usually three in a whorl. Queen land, &c.

O. maculata (spotted). A synonym of *O. borbonica*.

OCIMUM (from *Okimon*, the old Greek name, used by Theophrastus, for Basil). Basil. Including *Becium*. SYN. *Ocymum*. ORD. *Labiatæ*. A genus of half-hardy herbs, sub-shrubs, or small shrubs, broadly dispersed over the

Ocimum—*continued.*

warm regions of the globe. Flowers often white, small, or mediocre; whorls six to ten-flowered, disposed in terminal, simple, or paniculate racemes; bracts rarely exceeding the flowers. Few of the species have any horticultural value, though *O. Basilicum* is largely grown in pots, on the Continent, for room decoration. For culture, &c., of the annual species, *see* **Basil, Sweet.** The shrubby kinds may be increased by cuttings of the young shoots, inserted in sandy soil, in a frame, and kept shaded until rooted. All like well-drained, rather dry, sandy loam.

FIG. 712. PORTION OF PLANT AND PIECE OF DETACHED INFLORESCENCE OF OCIMUM BASILICUM.

O. Basilicum. Common, or Sweet Basil. *fl.* white; racemes simple. August. *l.* petiolate, ovate or oblong, narrowed at the base, a little toothed. *h.* 1ft. Warm regions of Asia and Africa, 1548. Erect or ascending annual. See Fig. 712.

O. canum (hoary). *fl.* white, in simple racemes; calyces longer than the pedicels. July. *l.* petiolate, ovate, narrowed at both ends, almost entire, canescent beneath. *h.* 1ft. Madagascar, &c., 1822. Plant erect, herbaceous, pubescent. (B. M. 2452.)

O. febrifugum (febrifuge). A synonym of *O. viride.*

O. filamentosum (thready). *fl.* white, rather large, in simple racemes; corolla four times as long as the calyx. July to October. *l.* shortly petiolate, ovate-oblong, narrowed at both ends, acutely serrated, finely pubescent. Stem shrubby, branched, tomentose. *h.* 2ft. to 3ft. East Africa, 1802. (B. R. 1843, 15, under name of *Becium bicolor.*)

O. micranthum (small-flowered). *fl.* small, arranged in whorls of three, in terminal leafless racemes; corolla nearly white. May. *l.* rather long-stalked; young ones oblong, acuminated; older ones 3in. or more long, broadly ovate, acute, serrated. *h.* 8in. to 10in. West Indies, 1825. Annual. (B. M. 2936, under name of *O. montanum.*)

O. minimum (least). Bush Basil. *fl.* white, in short, simple racemes; whorls loose. Summer. *l.* on long petioles, ovate, almost or quite entire. Stem erect, finely pubescent. *h.* 6in. to 12in. Chili, 1573. Annual.

O. montanum (mountain). A synonym of *O. micranthum.*

O. scutellarioides (Scutellaria-like). A synonym of *Coleus scutellarioides.*

O. viride (green). *fl.* greenish-white, in branched racemes; corolla hardly exceeding the calyx. July to October. *l.* petiolate, ovate-oblong, acuminated, crenated, narrowed at base, glabrous or downy on the ribs; floral ones bract-formed. Stem shrubby, branched. *h.* 2ft. to 4ft. West Africa, 1816. The leaves of this species are used in the manner of tea, as a febrifuge, at Sierra Leone, under the name of Fever Plant. (B. R. 753, under name of *O. febrifugum.*)

OCOTEA (said to be the native name of the tree in Guiana). SYN. *Oreodaphne.* ORD. *Laurineæ.* A large genus (about 200 species) of stove or greenhouse trees, or rarely shrubs, for the most part natives of tropical and sub-tropical America, a few being found in the Canary Islands, South Africa, and the Mascarene Islands. Flowers small, glabrous, or rarely slightly tomentose, disposed in axillary or almost terminal pedunculate panicles; perianth tube short or campanulate; limb segments six. Leaves

Ocotea—*continued.*

alternate or scattered, rarely almost opposite, coriaceous, penniveined. The undermentioned is probably the only species yet introduced. It thrives in well-drained loam, and is propagated by cuttings of the young ripened wood, inserted, during summer, in a sandy soil, under a bell glass.

O. bullata (blistered). *fl.* green, remarkably small, racemose. *l.* olive or brownish-green, alternate, coriaceous, elliptical, entire, acute, rather obtuse at base, and having at the axils of two or more of the lower costal veins on the under side, deep pits or hollows, exhibiting on the upper side corresponding elevations (whence the specific name). Cape of Good Hope. Greenhouse tree. (B. M. 3931, under name of *Oreodaphne bullata.*)

O. californica. *See* **Umbellularia californica.**

OCTADESMIA (from *okto*, eight, and *desme*, a bundle; in reference to the eight pollen masses). ORD. *Orchideæ.* A genus comprising only three species of stove, epiphytal orchids, natives of Jamaica and San Domingo. Flowers mediocre, shortly pedicellate; sepals almost of equal length, somewhat spreading; petals a little broader than the sepals; lip at base of column nearly erect; peduncle terminal, simple or slightly branched. Leaves linear-lanceolate, distichous, somewhat rigid, not fleshy. *O. montana*, the only species in cultivation, is a singular little orchid, more curious than beautiful. It succeeds in an intermediate house, planted in a small teak basket, using a compost of peat fibre, sphagnum, and bits of charcoal. Water must be liberally supplied during summer, and, to a considerable extent, withheld during winter.

O. montana (mountain). *fl.* white, suffused with a fulvous colour; sepals and petals lanceolate; lip oblong-linear, crenulate; raceme terminal, few-flowered. October. *l.* distichous, serrulate at apex, linear-lanceolate, sheathed at base. *h.* 6in. Rio Janeiro, 1826. (B. M. 2823, under name of *Octomeria serratifolia.*)

OCTANDROUS. Having eight stamens.

OCTOGYNOUS. Having eight styles.

OCTOMERIA (from *okto*, eight, and *meris*, a part; in allusion to the pollen masses). SYN. *Aspegrenia.* ORD. *Orchideæ.* A genus of greenhouse, epiphytal orchids. Nearly a score species have been described, although, probably, not more than three have been introduced; they are natives of Brazil, Guiana, and the West Indies. Flowers whitish or yellowish, inconspicuous, in dense, sessile clusters; anther-bed rotundate, rostellum short; pollinia eight. Leaves oblong, linear, or sub-terete. Stem developed. These curious little Pleurothallis-like epiphytes are frequently imported along with Bromeliads, about the bases of which they grow on the trunks of large trees. **For their cultivation they require greenhouse treatment. They thrive in pots of peat and sphagnum, and require abundance of water at all times.**

O. graminifolia (grass-leaved). *fl.* pale yellow, with two red spots; perigonal divisions ovate-lanceolate, interior little shorter; lip cuneate-oblong, blunt, or minutely denticulate at the summit, obliquely two-crested, and with two short lateral lobes at the middle. May. *l.* lanceolate-linear. *h.* 6in. West Indies, 1793. (B. M. 2764.)

O. Saundersiana (Saunders'). *fl.* pale yellow, with three purple stripes on the sepals and petals; lip ochre-coloured; disk and calli mauve, streaked in front, and numerously dotted. Winter. *l.* thick, terete, subulate. Brazil, 1880.

O. serratifolia (serrate-leaved). A synonym of *Octadesmia montana.*

O. tricolor (three-coloured). *fl.* white, small. *l.* cuneate-oblong, tessellated with purple beneath. Brazil, 1872.

OCTOMERIA (of Don). A synonym of *Eria.*

OCYMUM. A synonym of **Ocimum** (which *see*).

ODES, OIDES. A Greek termination, signifying similarity; *e.g.*, Phyllodes, leaf-like.

ODONTADENIA (from *odous, odontos*, a tooth, and *aden*, a gland; in allusion to the five-toothed glands). SYNS. *Anisolobus, Cylicadenia.* ORD. *Apocynaceæ.* A genus comprising about eighteen species of stove, scandent

Odontadenia—*continued.*

shrubs, natives of tropical America, mostly Brazil and Guiana. Flowers yellow, showy, disposed in loose, often large, rarely few-flowered and scarcely branched cymes; calyx five-parted; corolla funnel-shaped or sub-hypocrateriform. Leaves opposite, penniveined. *O. speciosa*, probably the only species in cultivation, perhaps does best when planted out in a prepared border in the stove, and the long shoots trained along the rafters. If cultivated in pots, a fairly liberal amount of root-room must be accorded; and thorough drainage is always essential. Good turfy loam, pieces of charcoal, a handful of coarsely-crushed bones and sharp sand, make a compost in which the species succeed well. Insects must be kept in check by fumigation, or the use of one or other of the insecticides mentioned in this work. Odontadenias are propagated by cuttings of the young shoots, which strike readily in bottom heat.

O. speciosa (showy). *fl.* bright yellow, shaded with orange, large, of good form, and delicately scented. *l.* large, oblong-ovate, acute, quite smooth, dark green. Trinidad, 1854. SYN. *Dipladenia Harrisi.* (B. M. 4825.)

ODONTARRHENA. Included under *Alyssum.*

ODONTOGLOSSUM (from *odous*, a tooth, and *glossa*, a tongue; referring to the tooth-like processes on the lip). Including *Mesospinidium* (some of the plants grown in gardens under the generic name of *Mesospinidium*, belong to the genus *Cochlioda*). ORD. *Orchideæ.* This genus comprises, according to some authorities, over one hundred species of handsome stove orchids, inhabiting the Andes of tropical America, from Bolivia as far as Mexico. Flowers with spreading, free sepals; petals nearly equal; lip with its base parallel with the column, and its limb deflexed and generally crested in various ways; column usually long, narrow at the base, and eared, or winged, at the summit; pollen masses two, with a narrow caudicle attached to an oval gland. Leaves in nearly all the species ensiform, usually sub-coriaceous in texture, linear-lanceolate or simply lanceolate, complicate at base, tapering to a more or less acute point. This genus is distinguished from *Oncidium* by the column being long and narrow, or, at any rate, not swollen, at the base, and by the base of the lip being always parallel with the face of the column.

For purposes of cultivation, the Odontoglossums may be divided into two groups, comprising (1) all those species which require the treatment of an intermediate house, *i.e.*, a temperature not lower than 50deg. to 55deg. in winter, and correspondingly high in summer; and (2) those which will thrive in a cool house, from which frost only is excluded, or, for safety, say, where the temperature will not fall below 40deg. Many of these plants, as well as other orchids, are found at very high elevations, where, at some seasons, they are visited by slight frosts and snow. Recently, many species of *Odontoglossum* have been successfully cultivated out of doors under the shade of trees, and where the atmosphere about them could not become too parched. The plants are hung up, either in baskets or on rafts, exactly as when cultivated under glass, and are syringed frequently in dry weather; they are not injured, but, on the contrary, much benefited, by frequent showers of rain. It is probable that, as these and other orchids become cheaper, they will be cultivated at much less cost than at present, and no doubt outdoor cultivation, for at least a portion of the year, will be adopted for a great number of those from cool and temperate climes. Even those from warmer regions would most probably be improved by open-air cultivation during our hot season. For the species requiring warm-house treatment, and which are distinguished in the subjoined list by a dagger (†), the following points must be attended to. When making their growth, which is during the summer, they require plenty of water, a position near

Odontoglossum—*continued.*

the glass, where they would be shaded only from bright sunshine, and a moist atmosphere, with plenty of fresh air about them, care being taken that the temperature does not fall too low through the latter. During the winter, they should be kept almost dry, and, in spring, quite dry till the flower spikes appear, when water should be applied liberally, and continued till the summer's growth is again completed.

The species grown in a cool house do not, as a rule, require a resting season similar to the above, but should be kept uniformly moist at the roots all the year round; indeed, many of them grow freely all through the winter. None of them like direct sunshine in summer, but in winter they enjoy all the sunlight possible. It is, therefore, a good plan to place the plants in a house with a northerly aspect for the summer, whilst, on the return of the cold, dull weather of winter, they may, with advantage, be removed into a house with an aspect due south. In the United States, the Odontoglossums invariably make two growths a year, the one in summer, and the other in winter, the latter being favoured by the clear and bright light which prevails in North America in winter. It should be remembered that, whilst very few orchids—certainly no Odontoglossums—enjoy excessive sunlight, they are, nevertheless, much healthier and more floriferous when grown in a house where they can obtain all the light possible, short of the fierce sunlight of our summers. Generally, Odontoglossums require a moist atmosphere at all times, and, after a bright day, are much invigorated by a gentle dewing overhead by means of a syringe. A few of the species, such as *O. Cervantesii*, *O. Londesboroughianum*, *O. Rossii Dawsonianum*, &c., may be satisfactorily grown when fastened on to a block, formed of fern stem; but Odontoglossums succeed best when grown in baskets or in pots, using a mixture of peat (broken into lumps the size of walnuts) and sphagnum, with a few lumps of charcoal and a little sand scattered through it. Pots should be half-filled with drainage, and baskets covered at the bottom with a large crock, or a few pieces of charcoal. Round the top of the soil a little fresh sphagnum should be placed; it will soon grow, and cover the whole surface with a fresh green, and prevent excessive evaporation in hot weather. To establish newly-imported Odontoglossums, they should be first carefully examined, and all dead bulbs, scales, and roots cut away; they may then be rinsed in warm water, and allowed to dry, before placing them in a little soil. The pots used should be as small as possible, all that is necessary being room for the base of the plant to stand in each with a little peat and sphagnum about it. Very little soil must be used, the pot being filled almost full of crocks; unless this precaution is taken, there is danger of the weakened plants being injured, and perhaps killed, by the water which would be held about them by a large body of soil. They should be placed in a shaded part of the house where they are to be grown when established. It is not wise to attempt to force the plants into growth by subjecting them to a high temperature, as the effect of this, although promising at first, is to weaken the whole plant by causing it to start into growth before it has recovered from the injuries caused by importation. All the Odontoglossums are propagated by division, none having, as yet, been raised from seeds in this country. Mr. H. Veitch, in his paper on the "Hybridisation of Orchids," read at the Orchid Conference, on May 13th, 1885, says that numerous crosses between various species, both Mexican and New Grenadan, have been effected, and capsules, with apparently good seed, have been produced; but, with the utmost care that could be bestowed, no progeny has yet been raised.

The plants which are, perhaps, best known under the names of *O. Phalænopsis*, *O. Roezlii*, *O. vexillarium*, &c.,

Odontoglossum—*continued.*

but which, in this work, are referred to the genus *Miltonia*, will not hybridise—or, at any rate, no one, up to the present time, has succeeded in making them do so—with any of the true Odontoglots. Certainly, it appears to favour the view here taken of the generic affinities of the plants in question, when, on the authority of Messrs. Veitch and Sons, we are enabled to state that, with other Miltonias, they cross and intercross readily.

Odontoglossum—*continued.*

Through some mistake or other, Mr. Bentham, in the "Genera Plantarum," asserts the contrary.

A considerable number of Odontoglots, which are generally accorded specific rank, are here reduced to varieties. In this we have been guided, to a great extent, by Messrs. Veitch and Sons, who have made a special study of the genus, and carefully compared, as they flowered, the numerous specimens of each so-called

FIG. 713. ODONTOGLOSSUM CIRRHOSUM.

Odontoglossum—*continued.*

species in their magnificent collection. We are indebted to the firm in question for permission to peruse the manuscript of their yet unpublished monograph.

O. acuminatum (taper-pointed). A synonym of *O. Rossii.*

O. Alexandræ (Alexandra's). A synonym of *O. crispum.*

O. A. Bowmani (Bowman's). A synonym of *O. crispum guttatum.*

O. anceps (two-edged). A synonym of *O. maculatum.*

O. Andersonianum (Anderson's). A variety of *O. crispum.*

O. anthoxanthum (yellow-flowered). *fl.* sulphur-coloured, small, growing in a flexuous raceme; lip sub-cordate at the base, three-lobed. Peru, 1869.

O. aspersum (sprinkled). A variety of *O. Rossii.*

O. bictonense (Bicton).*† *fl.* about 1in. across, varying much in colour, most frequently yellowish-green, transversely barred with brownish-purple, whilst the lip is lilac, shaded with violet, or sometimes nearly white; spikes about 2ft. high, bearing from twenty to thirty flowers. April. Pseudo-bulbs and leaves bright green. Guatemala, 1835. This plant was formerly a great favourite, and, moreover, was the first Odontoglot which reached England in a living state; but, since the introduction of so many fine kinds, it has gone somewhat out of fashion. It is, however, remarkably free in its flowering and habit of growth. (B. M. 3812, under name of *Zygopetalum africanum*; B. O. 18; B. R. 1840, 66.) This species has many varieties, of which the two following are by far the best: *album*, in which the lip is pure white; and *superbum*, having sepals and petals heavily blotched with rich crimson-brown, and a deep coloured rosy-purple lip.

O. blandum (fair).* *fl.* yellowish-white, beautifully spotted and freckled with maroon-crimson; sepals and petals narrow and acuminated; lip with an ovate-acuminate, crisped blade. Columbia, 1870. A handsome plant, somewhat resembling *O. nævium*, but with the blade of the lip much more expanded. (B. O. 28.)

O. Bluntii (Blunt's). A synonym of *O. crispum.*

O. brevifolium (short-leaved), of gardens. A synonym of *O. coronarium.*

O. cariniferum (keel-bearing).† *fl.*, sepals and petals oblong-lanceolate, greenish outside, and furnished on the middle line with keels; inside they are chestnut-brown, bordered with greenish-yellow or yellow; lip with the claw of violet colour, the cordate-acute anterior part being white; panicle large, branched. *l.* cuneate-oblong, ligulate. Pseudo-bulb oblong, two-leaved. Central America, 1855. SYN. *O. hastilabium fuscatum.* (B. M. 4919; B. O. 10.)

FIG. 714. FLOWER OF ODONTOGLOSSUM CERVANTESII.

O. Cervantesii (Cervantes').*† *fl.* from 1in. to 2in. across; sepals and petals rosy-lilac, barred at the base with crimson-brown; lip cordate or triangular, white or lilac; spikes 6in. high, three to five-flowered. March and April. *l.* lanceolate, solitary. Pseudo-bulbs angular. Oaxaca, 1845. A pretty, dwarf-growing species. SYN. *O. membranaceum.* See Fig. 714. (B. R. 1845, 36; L. & P. F. G. i. 15.)

O. C. decorum (becoming). A fine variety, with larger flowers and more brightly-coloured markings than the type. (F. M. n. s. 254.)

O. C. majus (larger). A good variety, with larger and more brightly-spotted flowers than the type. Mexico, 1879.

O. C. punctatissimum (much-spotted). A handsome variety, having flowers covered with neat, purplish spots. 1878. (B. O. 10.)

O. cirrhosum (tendrilled).*† *fl.* milk-white, with deep purplish-violet dark spots on sepals, petals, and the anterior, inferior part of lip, the basilar part of which is whitish-yellow at both sides, and with purplish-violet radiating lines; sepals lanceolate, ending in bristles; petals much broader; lip cuneate, dilatates going out in two blunt, wavy angles, the upper part bearing an open sheath around the column, the anterior expanded; peduncles racemose or panicled, many-flowered, *l.* linear-ligulate. Pseudo-bulbs ligulate, ancipitate. Ecuador, 1876. See Fig 713, for which we are indebted to Messrs. Veitch and Sons. (B. M. 6317; G. C. n. s., v. 503.)

O. c. gemmatum (jewelled). A good variety, with groups of mauve or purple stains at the base of the sepals and petals.

O. c. Hrubyanum (Hruby's). A variety having flowers without spots, or with but few traces of them.

O. c. Klabochianum (Klaboch's). A variety with much larger flowers than the type.

O. citrosmum (Lemon-scented).*† *fl.* pure white, delicately lemon-scented; lip purple, crescent-shaped; racemes pendulous, bearing from fifteen to thirty flowers. May. *l.* thick. Pseudo-bulbs smooth, shining light green. Guatemala, 1840. SYN. *O. pendulum* (B. O. 6). (B. R. xxix. 3; F. d. S. 633.)

O. c. album (white). *fl.* white, except the crest on the claw of the lip.

O. c. punctatum (dotted). *fl.* pale rose; sepals and petals dotted with purple.

O. c. roseum (rose). *fl.* having the blade of the lip deep rose.

O. constrictum (contracted). *fl.*, sepals and petals bright yellow, with orange-brown blotches and bars; lip pandurate, white, tipped with yellow, and bearing two conspicuous rose-coloured spots near the centre; panicles large, branched, many-flowered. *l.* elongate, linear-lanceolate. Pseudo-bulbs ovoid, compressed, ribbed, dark green. Caraccas, 1843. A pretty, free-flowering plant. (B. M. 5736.)

O. c. Sanderianum (Sander's).* *fl.*, sepals and petals light ochre, with brown marks and stripes, lanceolate, acuminate; lip cordate at base, with two short, upright lobes; blade large, sub-pandurate, acute, wavy, white, tinted with sulphur, and having a large purple-crimson mark between the calli, and some spots in front. Columbia (?), 1881. A handsome, Hawthorn-scented variety, superior to the type.

O. Coradinei (Coradine's). A variety of *O. Lindleyanum.*

O. cordatum (heart-shape-lipped). *fl.*, sepals and petals yellow, blotched and barred with deep rich chocolate-brown, very much elongated, and curiously wavy; lip large, heart-shaped, varying somewhat in its markings, ground colour white, blotched with lilac and purplish-red, or sometimes with pale yellow and crimson; scape 1ft. or more in height, stiff, erect, simple or branched, few or many-flowered. Late spring. *l.* bright green, with yellow lines. Pseudo-bulbs oblong, generally one-leaved. Guatemala and Mexico, 1837. A free-flowering and easily-grown species, though less striking than many of its congeners. (B. M. 4878, under name of *O. maculatum*; B. O. 25; R. G. 356.)

O. c. sulphureum (sulphur-coloured). *fl.*, sepals sulphur-coloured; petals and lip white, with sulphur tips and blotches. Mexico, 1880. A highly curious variety.

O. coronarium (crowned).* *fl.*, sepals and petals reddish-brown, edged with yellow; lip bright golden-yellow; spike erect, 1ft. or more in height, bearing from thirty to forty blossoms. Pseudo-bulbs large, wrinkled, flat, produced at intervals along a creeping rhizome, bearing a short, oblong leaf at the apex. Peru, 1868. (B. O. 27; G. C. n. s., xii. 301; W. O. A. i. 27, under name of *O. brevifolium.*)

O. c. Dayanum (Day's). *fl.*, petals yellow, with brown marbling; lip with two conical acute warts on each side of the crest.

O. crinitum (hairy). *fl.* striped and blotched, racemose; sepals and petals lanceolate, acuminate; lip covered with filiform processes. Columbia, 1882. A very distinct species. (R. X. O. 191, 3.)

O. crispum (curled).* *fl.*, sepals and petals pure white, ovate or ovate-lanceolate, the petals being much undulated, and often fimbriately toothed; lip oblong-acuminate, yellow, crested towards the base, beautifully crisped at the margin, and more or less spotted towards the front with blotches of reddish-brown; racemes pendulous, usually from six to twelve-flowered. New Grenada. This is one of the gems of the cool orchid-house, since, by a little management, its charming flowers may be had all the year round. It is a plant which varies to an almost endless extent, no two, of the many thousands imported, being, perhaps, exactly alike, and very considerable difference in size, colouring, or crispness in the flowers constantly presenting itself. See Fig. 715, for which we are indebted to Mr. Wm. Bull. SYNS. *O. Alexandræ* and *O. Bluntii* (F. d. S. 1652). (B. O. 19.)

O. c. Andersonianum (Anderson's).* *fl.* milky yellowish-white, with some very broad, cinnamon, longitudinal stripes; sepals and petals ovate-oblong, acute, crisped; lip pandurate, with wavy and toothed margins. Pseudo-bulbs ligulate, pyriform. Columbia, 1868. A very handsome and rare plant. SYN. *O. Josephinæ* (W. O. A. iv. 188). (F. M. n. s. 45; W. O. A. i. 35.)

Odontoglossum—*continued.*

O. c. A. guttulatum (small-spotted). *fl.* beautifully marked with small brown spots on the sepals and petals; lip white, with a yellow base and a few brown lines. A pretty sub-variety.

O. c. Chestertonii (Chesterton's). *fl.*, sepals and petals broad, the sepals white, with small reddish-brown transverse blotches; petals white, with two to five red-brown spots; lip red-brown, with a broad, yellowish-white margin.

O. c. fastuosum (proud). *fl.*, odd sepal deep bluish-lilac, with a white border and two large brown-violaceous blotches; lateral sepals white on the inner half, lilac-violet on the outer, blotched brownish-violet towards the base; petals white, with a brownish-violet line at base; lip obovate, very flat; keels yellow. A distinct variety. 1878.

O. c. flaveolum (yellowish). A distinct variety, with yellow flowers, and a very few red spots and lines. Bogota, 1880. (W. O. A. i. 43.)

O. c. giganteum (gigantic). *fl.* white, spotted all over very profusely with reddish-brown, large; spike 3ft. high, branching, and many-flowered. A very fine, but rare, variety.

O. c. guttatum (spotted).* A well-marked variety. To the general features of the typical species, it adds larger flowers, of a pure white ground colour, with a few well-marked spots of a coppery red on each sepal and petal, and the singularly oblong-

FIG. 715. ODONTOGLOSSUM CRISPUM.

Odontoglossum—*continued.*

quadrate appendiculate lip suffused with yellow towards the base, where it is margined with brown spots, terminating in one larger central one, and forming a ring around the disk. New Grenada, 1867. SYN. *O. Alexandræ Bowmani* (B. M. 5697, under name of *O. Alexandræ guttatum*; W. O. A. ii. 94.)

O. c. Jenningsianum (Jennings').* *fl.* cream-white, with many light cinnamon blotches, which are very numerous in the petals; base of lip yellow, with a few cinnamon lines. 1878. A pretty plant, the flowers of which are said to be exceedingly like those of *O. c. Ruckerianum*, but distinct by their very crisp, wavy nature, and by the basilar callus of the lip. (G. C. n. s., ii. 366.)

O. c. Lehmanni (Lehmann's). *fl.* usually purple, with a brown tint, numerous; inflorescence branched. *l.* rather narrow. South America, 1880. A curious plant.

O. c. limbatum (bordered). *fl.* milk-white; sepals richly marked with lilac; lip with numerous violet spots at the tip, and with yellow lamellæ and a few streaks at the base; panicle many-flowered. Columbia, 1870. An interesting orchid. (R. X. O. 183, 2.)

O. c. Mariæ (Miss Marie André's). A beautiful variety, with pure white flowers, except two red spots at base of lower sepals, a few red streaks on the column, and the callus tinted with yellow. Columbia, 1879. (I. H. n. s. 325.)

O. c. Ruckerianum (Rucker's).* *fl.*, ground colour creamy-white; sepals and petals bordered with deep violet, with a few chestnut-brown blotches on their inner surfaces; narrow lip, yellow at the base, with blotches of chestnut-brown. (G. C. 1873, 105.)

O. c. Stevensii (Stevens'). *fl.* white, heavily barred with light brown, large; lip with a clear yellow disk. A grand form. (W. O. A. iii. 127.)

O. c. Trianæ (Triana's).* *fl.* white, flushed, especially on the upper half of the dorsal sepals, with rose, the rosy portion being spotted with carmine, the dorsal sepal bearing a single large rosy spot; 2½in. across, crowded in a dense spike; the lip is large, rounded, and two-lobed at the apex, white, freely spotted with coppery red. Columbia, 1868. A very beautiful variety. (B. M. 5691.)

O. c. Veitchianum (Veitch's).* *fl.*, sepals and petals white, with a zone of mauve and some brown blotches, broad. 1884. A fine form.

O. c. Warneri (Warner's).* *fl.*, sepals white, stained with rose, and spotted with purplish-brown; petals very broad, toothed at the edges, pure white; lip large, white, stained at the base with rich yellow. Columbia, 1869. A splendid form.

O. c. xanthoglossum (yellow-lipped). A variety with a yellow lip, having a few lines and a large lobed blotch of brown. 1883.

Other varieties of *crispum* are: *aureum*, *Ballantinei*, *Cooksoni* (W. O. A. iii. 118), *elegantissimum*, *Reginæ*, *roseum* (F. M. n. s. 269), *Rothschildianum*, *Sanderianum*, *sulphureum*, and *virginale*.

O. cristatum (crested).* *fl.* creamy-yellow, varying in intensity in the different forms, banded or spotted with very dark brown or purple, and about 2in. in diameter; lip whitish, spotted with dingy brownish-purple, with a radiating white crest. Pseudo-bulbs somewhat oval, of a light shining green, bearing very narrow leaves of the same hue. Peru. A very desirable species, although not so showy as many others. (I. H. 1870, 21.) The following are varieties:

O. c. Argus (Argus). *fl.* bright yellow, with purplish speckles and freckles; lip and column white, with purplish markings. (I. H. ser. ii. 21.)

O. c. canaria (canary-coloured). *fl.*, sepals and petals bright clear yellow, each with a single purplish blotch.

O. c. cristatellum (slightly-crested). *fl.* light yellow, with a few sepia-brown spots; lip short, narrow, nearly oblong-pandurate, apiculate, undulate, anterior part sepia-brown; the front side of column has three violet spots on its base, and some brown lines. Winter. 1878. (W. O. A. 66.)

O. c. Dayanum (Day's). A variety with a rhomboid, apiculate, serrate lip, the crests on its base crossing one another.

O. crocidipterum (saffron-winged). *fl.* pale yellow, spotted with brown, from 2in. to 3in. across, deliciously scented like Hawthorn; lip having a bilobed, white crest, around which is a blotch of clear lemon-yellow; spikes from 1ft. to 1½ft. long, many-flowered. August and September. Pseudo-bulbs compressed and conical, two-leaved. Columbia, 1870. (R. X. O. ii. 192.)

Odontoglossum—*continued.*

O. Dormanianum (Dorman's).* *fl.* whitish, with numerous dark spots, and resembling those of *O. crocidipterum*; base of the lip yellow, sometimes with a few red stripes; tip of the lip with a large blotch. *l.* very narrow, and short. Pseudo-bulbs elliptical, blunt, two-edged, grooved and wrinkled. 1884.

O. Edwardi (Edward Klaboch's).† *fl.* mauve-coloured, with a light purple hue; lip with an ochre-coloured callus; inflorescence many-flowered. Ecuador, 1878. (B. M. 6771.)

O. elegans (elegant).* *fl.*, sepals and petals faint yellowish, with narrow, brown blotches; lip yellowish, with the apical part white, having two long, serrate calli, and two small, acuminate, extrorse, adventitious ones marked with reddish spots. Ecuador, 1879. A natural hybrid, much resembling *O. cirrhosum*. (Gn. xxiv. 459; W. O. A. iii. 3.)

O. Galeottianum (Galeotti's). *fl.* white; petals transversely barred with brown at the base; lip with a few streaks of yellow near the base; raceme few-flowered. Mexico, 1870. Allied to *O. nebulosum*, and very rare in cultivation.

O. gloriosum (glorious). A synonym of *O. odoratum*.

O. grande (magnificent).* *fl.* from 4in. to 7in. in diameter; sepals and petals rich glossy orange-yellow, the basal half being transversely banded and blotched with bright chestnut-brown; lip creamy-white, more or less freckled with brown; scapes stout, erect, from four to nine-flowered. Autumn and winter. *l.* lanceolate, broad, 6in. to 9in. long, dark green. Pseudo-bulbs glaucous, thick, slightly angular, two-leaved. Guatemala, 1839. This is one of the most beautiful, the largest the best known, and the easiest grown of orchids. (B. M. 3955; B. O. 8; R. G. 1859, 270; W. O. A. ii. 79.)

O. g. splendens (splendid). A rare and beautiful variety, differing from the type in having brown markings and a nearly white lip, with pure purplish bars. 1872.

O. g. Williamsianum (Williams'). This resembles the type, but has shorter, broader, and more obtuse petals; column with uncinate wings. 1881. (W. O. A. 163.)

FIG. 716. FLOWER OF ODONTOGLOSSUM HALLII.

O. Hallii (Hall's).* *fl.* about 4in. across; sepals and petals pale yellow, with large chocolate-brown patches, and terminating in long points; lip pure white, with a beautifully-fringed margin, spotted and blotched with brown and purple, and stained towards the base with deep yellow; spike many-flowered. *l.* light green, 1ft. or more long, 2in. broad. Pseudo-bulbs about 3in. high. Ecuador, 1865. See Fig. 716. (B. M. 6237; B. O. 21; F. M. 1868, 378; I. H. ser. iii. 58.) The variety *xanthoglossum* is distinguished principally by having a yellow lip. Columbia, 1879.